

FLIGHT

The
AIRCRAFT ENGINEER
AND AIRSHIPS

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EDITORIAL COMMENT



NCE again the eve of the Royal Air Force Display at Hendon has come round, and all who love flying are agog to see once more the greatest of all flying exhibitions in the world. The ingenuity of the Display Committee must be severely taxed each year to provide some sight which has an element of novelty. This year that problem is not too thorny. The last year has been largely one of re-equipment, and great progress has been made in giving our squadrons aircraft of the latest types. Those types are very good indeed. It is true that in previous years the R.A.F. has been able to boast a number of fighter squadrons flying the "Bulldog" and the "Fury," and day bomber units equipped with the "Hart." The fine exhibition given last year by the nine "Harts" of No. 12 (Bomber) Squadron will not soon be forgotten. But this is the first year in which it can be said that nearly all the squadrons of the command Air Defence of Great Britain are provided with aeroplanes of really up-to-date types. We have three interceptor squadrons using the "Fury," and all the other fighter squadrons except two have been given the standard fighter, the "Bulldog." The other two will doubtless receive the same machine before long. With our defence entrusted to the "Bulldog" and the "Fury" we may feel confident that any foes who may attempt air raids on Great Britain will meet with so hot a reception that they will speedily realise that the game is not worth the candle. At the same time all the day bomber squadrons of the Bombing Area have now received either the "Hart" or the "Gordon," except two who still retain the Fairey III F, and for them, too, "Gordons" have been ordered. In No. 1 Air Defence Group, which includes all the Auxiliary and Cadre squadrons—that is to say, all the citizen airmen with a certain nucleus of regulars—the day bombers with one exception use the "Wapiti," a very sound aeroplane which is still in the first rank. Thus our day bomber squadrons are in a very satisfactory position as regards flying equipment.

The R.A.F. Display

DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list:—

- June 21-28. Blackpool Air Pageant, Stanley Park.
- June 24. 10th Annual Dinner of R.A.F. Club.
- June 25. R.A.F. Display, Hendon.
- June 25-26. International Tourist Rally, Boulogne.
- June 26. "Tatler" Concours d'Elegance, Brooklands.
- June 28. Visit to National Physical Laboratory, Teddington.
- June 29-30. Cricket: R.A.F. v. Army at the Oval.
- July 2. Arrival of Graf Zeppelin at Hanworth, 6 p.m. approx.
- July 2. Opening of Portsmouth Municipal Aerodrome.
- July 2-3. International Tourist Rally, Rheims.
- July 3. Meeting at Cote Hill Aerodrome, Rugby.
- July 5-7. R.A.F. Athletic Championships at Uxbridge.
- July 8-9. King's Cup Air Race, start and finish Brooklands.
- July 9. R.A.F. Athletic Championships at Uxbridge.
- July 9-10. International Tourist Rally and Meeting, Clermont-Ferrand.
- July 14. International Rally, Saint-Brieuc.
- July 16-17. International Meeting, Dieppe.
- July 21. General Meeting of R.N.F.C. in the R.U.S.I., 5.30 p.m.
- July 22-31. International Meeting, Zurich.
- July 23-24. York County Aviation Club "At Home," Sherburn-in-Elmet.
- July 30-31. Skegness Air Pageant.
- Aug. 1. Cowes Air Pageant.
- Aug. 11-28. International Touring Competition, Berlin.
- Aug. 15-16. Cricket: R.N. v. R.A.F. at Lords.
- Aug. 19-21. 4th Annual Canadian Air Pageant, St. Hubert, Quebec.
- Aug. 20. Ryde Air Pageant.
- Sept. 3. Leicester Chamber of Commerce Day, at Desford.
- Sept. 4. Divine Service at Ratcliffe Aerodrome, 2.30 p.m.
- Sept. 5. F.A.I. Conference at The Hague.
- Sept. 8. International Meeting, Vicenza, Italy.
- Sept. 24. Air Display at Hillmans' Aerodrome, Gallows Corner, Brentwood.
- Sept. 25. Gordon Bennett Balloon Race, Basle.
- Oct. 1. Bristol and Wessex Ae.C. Garden Party.
- Oct. 18. Aero Golfing Society: Cellon Challenge Cup, West Hill G.C.
- Nov. 18-Dec. 4. Paris Aero Show.

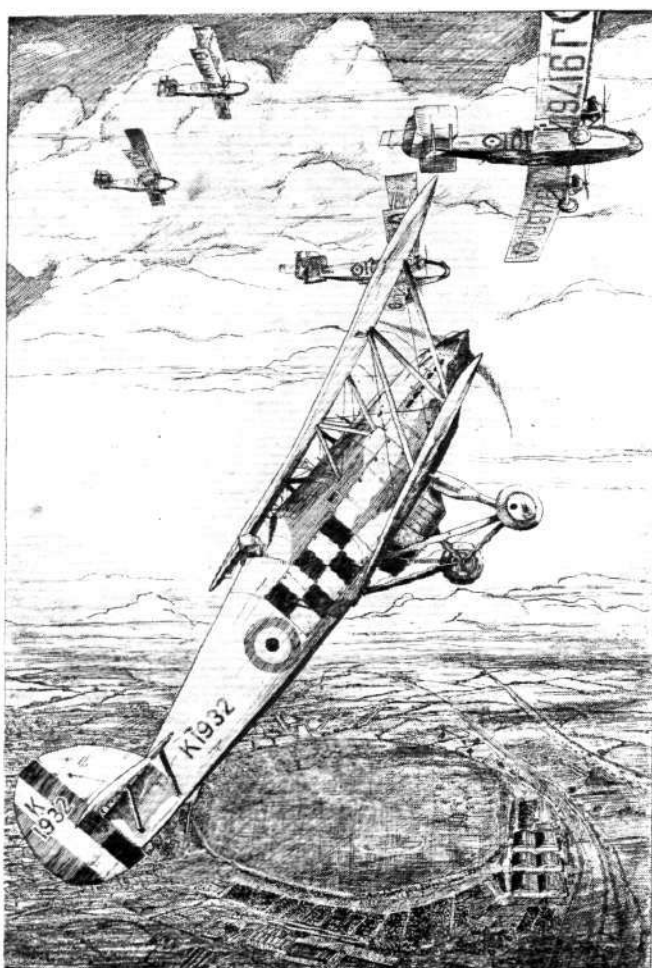
This satisfactory progress in re-equipping the units permits a new standard to be introduced into the items of the R.A.F. Display. This year a whole wing of three squadrons, all flying "Harts," will manoeuvre in unison, and that is a sight which has never been seen before. The last time when a fighter squadron indulged in squadron aerobatics was in 1930, when No. 43 F.S. gave a remarkable exhibition with the wing tips of the machines fastened together with elastic rope. That year the squadron was flying "Siskins." This year the same squadron will give another exhibition, but this time they are flying "Furies." Those who have had the privilege of witnessing the Display at Andover last week know how excellent is the quality of the show to be given by the wing of "Harts" and by the "Furies" of No. 43 F.S. Another point about these items is that, as the machines are now faster than were the machines of former days, there is less time spent in wheeling and changing formation, and so the whole programme has been speeded up.

The Auxiliary Air Force will participate in this year's Display to a degree never attempted before. The state of efficiency reached by these citizen airmen is really most remarkable. They do all their flying in their spare time, but so keen are the pilots that they contrive to put in a total of flying hours which would seem quite respectable even for a regular squadron. It is a question whether any non-regular fighting force in the history of the world has ever achieved such proficiency as that now attained by the Auxiliary Air Force. Consequently they are well worth going to Hendon to watch. Three A.A.F. bomber squadrons will take part in a combined movement, in the course of which they will assume a formation which spells out the three letters "A.A.F." The nine "Wapitis" of each squadron will be so arranged as to spell one of these letters. It will certainly be a novel sight, and one well worth seeing. Of course, no squadron would indulge in such antics in time of war. These letters do not constitute a fighting formation. But they testify to skill in flying and in keeping formation. They will be a much more difficult formation to keep than the normal squadron formation of three flights arranged as a broad arrow, and each flight composed of three machines also in an arrow—or than the Squadron V, when all the nine bombers form one large V. So this fanciful flying is really a very searching test of the skill of each pilot and also of the combined work of the squadron. So high has the skill of the

Auxiliary squadrons risen of late that in the King's Birthday honours the Prince of Wales was appointed Honorary Air Commodore-in-Chief of all the squadrons in the A.A.F., a unique compliment to the work of these units, which they have well deserved.

Many events, of course, will be largely repetitions of what has been seen in former years, but no little ingenuity has been exercised in varying the details. Most of these items are too good to omit. No Display would be a display unless there was an air combat. This year three "Bulldogs" will attack a

"Sidestrand." The public will be able to note the superior speed of the fighters, but at the same time they will probably be astonished to see how the large twin-engined bomber can manoeuvre, throwing the guns of the fighters off the mark by looping and sharp banking. Combined aerobatics and aerobatics with smoke are always events which it is a delight to watch, and one would never complain that they had been seen before. The set piece is a treat to those who love to hear big bangs and see things going up in flames—especially kite balloons. It was quite a good idea to combine the shooting down of the balloon with the set piece. Sometimes the story composed for the set piece has been framed with some object, such as to obviate the criticisms of pacifists. Thus at one Display the enemy were called Pirates, so that nobody could object to their flaming end. This year we are to

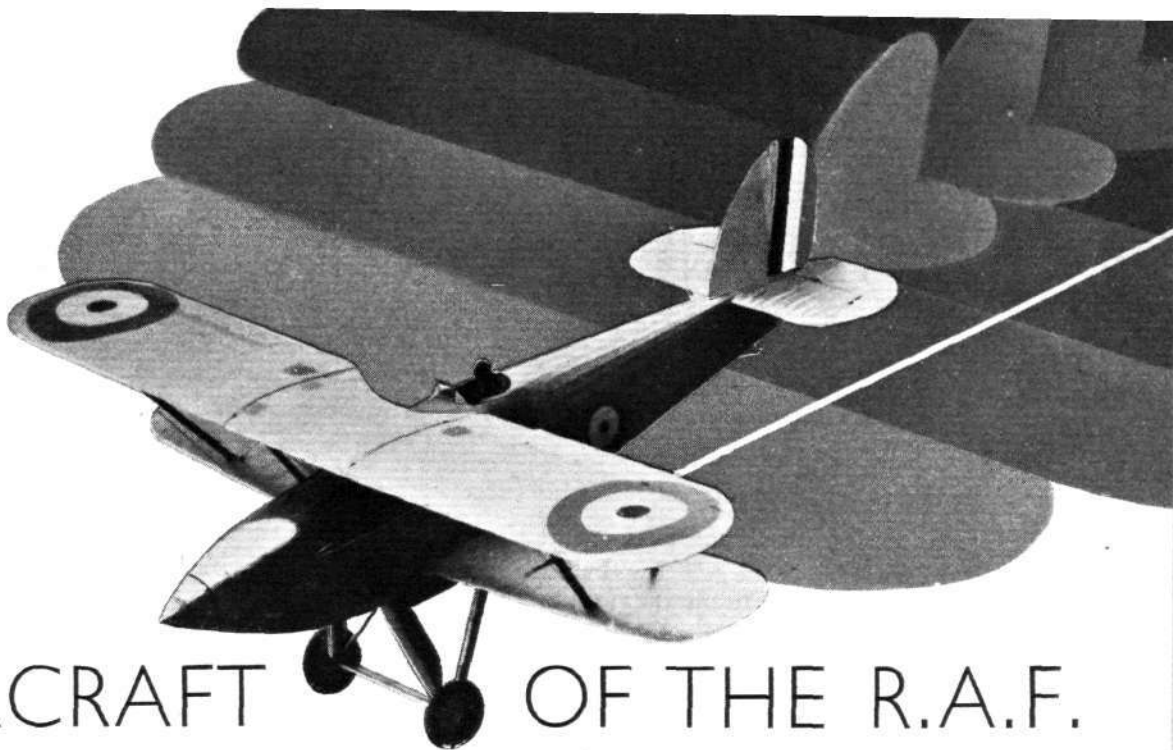


Intercepting: A Hawker "Fury" (Rolls Royce "Kestrel") climbing to the attack. (FLIGHT Sketch.)

have a battle piece, pure and simple, which is the best thing of all. The R.A.F. exists to defend us, so we may as well get some idea (so far as sham fighting can give it) of what our aircraft would do to those who may attack us.

The new types of machine may provide a particularly interesting sight to those who inspect with intelligence. We have already published photographs of a few of them. It is common knowledge that the Air Ministry is on the look-out for new types for more than one class of work. One, if not two, new types of flying boat are needed, but the new selections can hardly be shown in the machine park at Hendon—and it is not known if any selection has yet been made. A new type of night bomber is also a crying need, and more than one new type will be seen on Saturday. Whether one of those on view will be chosen is an interesting subject for speculation.

So long as we get fine weather, at least rainless weather, we are sure to enjoy ourselves as much as ever at Hendon.



THE

AIRCRAFT OF THE R.A.F.

specially compiled in connection with

THE THIRTEENTH R.A.F. DISPLAY

By Major F. A. de V. ROBERTSON, V.D.

FIGHTERS, bombers, Army aircraft, Navy aircraft, flying boats, troop-carriers, torpedo-planes—the public is beginning to grow accustomed to these names, and when the day of the Royal Air Force Display comes round, everyone begins to take a special interest in the different types and in air power in general. To those who have studied the proposals made to the Disarmament Conference, the subject is becoming one of very live importance. They have read that some people wish all bomber aircraft to be abolished, while others have suggested that only the League of Nations should possess heavy bombers. The reason given for these proposals was that bombers are essentially aggressive weapons, and cannot be used for defensive purposes. Not a few people have wondered if this view is correct. If a country is suffering much from shells made at a certain enemy factory and sends a heavy bomber to blow that factory to smithereens, is it not defending itself? If an aeroplane bombs a submarine, is it not defending its own shipping?

The Hendon Display gives an opportunity for study of some of these points, but events follow each other so fast that the mind is apt to suffer from indigestion. In the following pages all the aircraft now in use by the Royal Air Force at Home and overseas are shown and described, with photographs. The machines are grouped according to their functions. It must be remembered that in Great Britain and on the seas the Royal Air Force has three main duties. In the first place, it is responsible for the air defence of the country against raids by enemy aircraft, and to do this it has to be able to strike at the enemy in his own country. In the second place, it provides the aircraft needed by the Navy; and,

thirdly, it provides some squadrons specially trained to work with the Army. It also undertakes some coast-defence work, with flying boats and torpedo-planes. We have shown the machines used for each class of work.

Two points should be noted. One squadron, No. 24, is devoted entirely to communications. Its duty is to carry important personages from place to place in a hurry, and it has often performed this duty for the Prince of Wales. All the several types of aircraft used by this squadron are also used either for training or as day bombers, and so no section is devoted to communications work. The bomber-transport units, which are only used in the Eastern commands, are, however, shown as a separate section.

The other point is, that we have not shown a class of "General Purpose" aircraft. The term is only of importance to designers, and means a machine which can be used either as a day bomber or as an army co-operation machine. All the G.P. machines appear under one or other of these headings.

The performance figures given for the various types in the following pages are official figures and represent average performances under actual service conditions in the British Royal Air Force. It does not follow that in many types better results are not obtained in versions supplied to foreign Air Forces, as the equipment and load may be altered, the air-screws chosen for increased performance in a different direction, special fuels used to enable supercharging at lower altitudes, and so forth.

The endurance figures given do not take into consideration half-an-hour's running-up on the ground. The figures given show the length of flight possible after taking off.

THE AIRCRAFT OF THE R.A.F.

FIGHTERS

STANDARD FIGHTERS

SINCE the days when the D.H.2 and its contemporaries got the better of the Fokker monoplane, the fighting squadrons of the R.F.C., R.N.A.S. and Royal Air Force have seen many types of single-seater fighter. During the war no one type achieved absolute pre-eminence. In the last year of the war the greatest successes were won by the Sopwith "Camel" and the S.E.5.A., though had the Armistice not come when it did, the Sopwith "Snipe" would probably have dominated the air fighting. It gave a taste of its quality when Major Barker in a "Snipe" was attacked by some 60 enemy fighters, shot four of them down and escaped himself, though badly wounded. For this he received the Victoria Cross. For some years after the war the "Snipe" was the standard single-seater fighter of the Royal Air Force. It was succeeded by the Gloster "Grebe," with "Jaguar" engine. Next came the Gloster "Gamecock," with "Jupiter," which was given to all fighter squadrons except the two at Upavon, Nos. 3 and 17 F.S., which were equipped with the Hawker "Woodcock," with "Jupiter," as night-fighters. The next standard fighter was the Armstrong-Whitworth "Siskin," with "Jaguar" engine, which marked the introduction of metal aircraft for Service use. No. 23 F.S. at Kenley kept their "Gamecocks" and the two Upavon squadrons retained their "Woodcocks," but all the other fighter squadrons received the "Siskin." It remained the standard fighter for a number of

BULLDOG SISKIN

years, and is still used by the two squadrons at North Weald, Nos. 29 and 56 F.S.

Finality is never reached in R.A.F. aeroplanes. Our designers are always hard at work improving on existing performance. In recent years they

doubtless profited much by the research carried out in connection with the Schneider contests. The lessons of "cleaning up" a machine were thoroughly digested. It had already been realised at the time when the "Siskin" was designed that fighter aeroplanes ought to develop their best performance at a great height. When the "Siskin" had been in use for some years, the Air Ministry invited designs for a new type of fighter with still better performance, and a very keen competition between designers was the result. The list was finally narrowed down to two types, the Hawker "Hawfinch" and the Bristol "Bulldog." So hard was it to decide between them that the Air Ministry sent both types round to a number of squadrons for prolonged flying tests, so as to ensure that the machine selected should be the one preferred by the pilots who would have to use it. In the end the "Bulldog" was chosen. The first squadrons to receive the "Bulldog" were the two Upavon squadrons, Nos. 3 and 17, in replacement of the "Woodcock," and it has since been delivered to eight of the 13 units of the Fighting Area, the exceptions being the two at North Weald (who will probably get it soon) and the three interceptor squadrons on the coast aerodromes.

INTERCEPTOR FIGHTERS

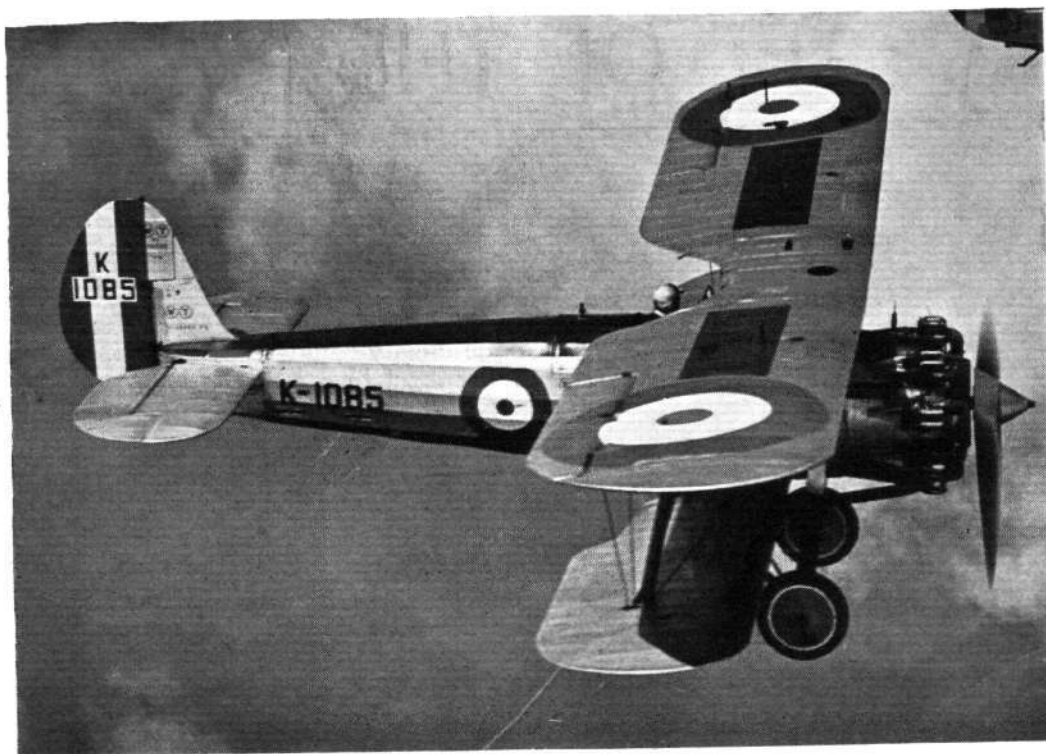
IN 1925 a special command, known as Air Defence of Great Britain, was formed. After two years of preparation, Air Exercises were held in 1927 and subsequent years to test the organisation. It was found that the fighter aeroplanes of the day had great difficulty in coping with the fastest of the two-seater day-bombers (at that time the Fairey "Fox"). The bombers would come in over the coast at a great height, and despite the speed with which the reports of their progress were passed to the headquarters of the Fighting Area, they were often able to drop their imaginary bombs and escape before the fighters could get to grips with them. Though the improvement in the standard fighters gradually gave the latter an advantage over the bombers, which became very definite when the "Bulldog" was introduced, there still remained the problem of getting the fighter squadrons into the air and up to the level of the raiders in the very short time allowed after the latter had crossed the coast. The Air Ministry, therefore,

FURY

decided to introduce a special class of interceptor fighters, in which the primary considerations were to be tremendously rapid climb, and very high speed at a great altitude. The production of this class was simplified by the production

about this time of the Rolls Royce "Kestrel" engine. It produces about 525 h.p., and, being water-cooled, it has a very small frontal area. The result was perfectly astonishing performance in the matter of climb and speed at altitude. For some time the decision wavered between two very fine types, the Fairey "Firefly" and the Hawker "Fury," and, finally, the choice fell upon the "Fury." This type has now been supplied to three squadrons on coastal aerodromes, Nos. 43 and 1 F.S. at Tangmere and No. 25 F.S. at Hawkinge.

It is a question whether interceptors should not be stationed further inland, to allow them more time after the receipt of reports, but this will doubtless be tested in future air exercises.



**BRISTOL
BULLDOG**

(*Bristol "Jupiter"*)

Wing Area, 305.6 sq. ft.
Gross Weight, 3,529 lb.
Maximum Speed at 15,000
ft., 163 m.p.h.
Endurance with Service Load
at Top Speed, 1.5 hr.
At Economical Cruising Speed,
3.8 hr.
Used by Nos. 3, 17, 19, 32, 41,
54 and 111 (Fighter) Squad-
rons.

(FLIGHT Photo.)

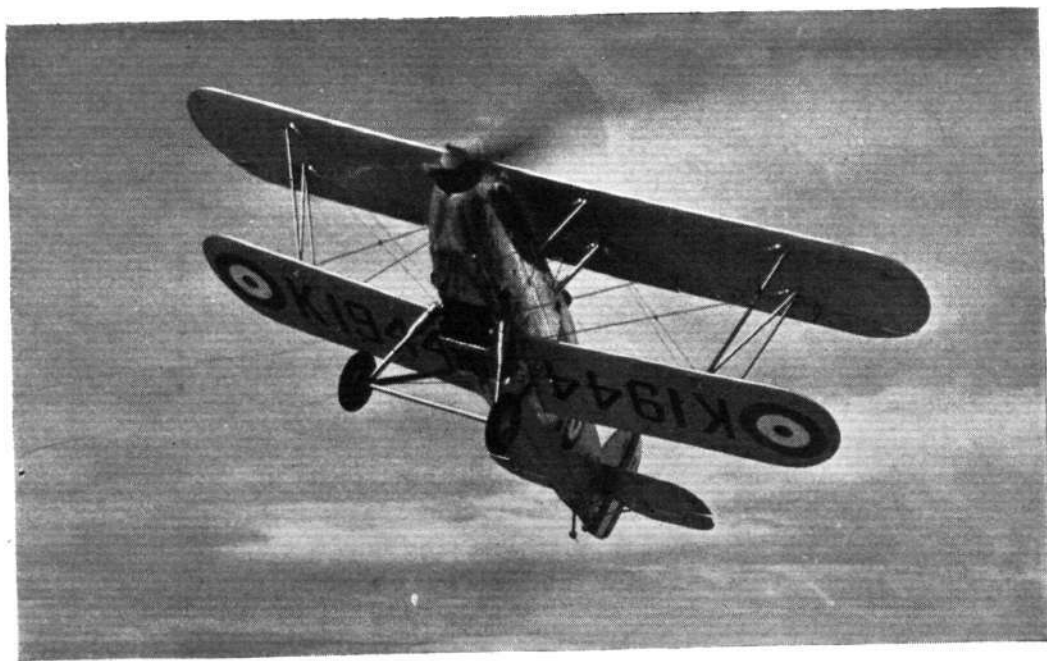


**ARMSTRONG - WHITWORTH
SISKIN IIIA**

(*Armstrong-Siddeley
"Jaguar"*)

Wing Area, 292 sq. ft.
Gross Weight, 3,232 lb.
Maximum Speed at 15,000
ft., 145 m.p.h.
Endurance with Service Load
at Top Speed, 1.25 hr.
At Economical Cruising Speed,
2.2 hr.
Used by Nos. 29 and 56
(Fighter) Squadrons.

(FLIGHT Photo.)



**HAWKER
FURY**

(*Rolls-Royce "Kestrel"*)

Wing Area, 251 sq. ft.
Gross Weight, 3,311 lb.
Maximum Speed at 15,000
ft., 205 m.p.h.
Endurance with Service Load
at Top Speed, 1.0 hr.
At Economical Cruising Speed,
3.2 hr.
Used by Nos. 1, 25, and 43
(Fighter) Squadrons.

(FLIGHT Photo.)

THE AIRCRAFT OF THE R.A.F.

FIGHTERS—(Continued)

TWO-SEATER FIGHTERS

IN the war the single-seater was considered the best fighter. In that class the guns are fixed, and the pilot aims his guns by aiming the whole aeroplane. He counts upon having much greater speed and manoeuvrability than his opponent, and as he dives to attack, the engine acts as a shield to his body. To the rear he is blind (unless he turns his head) and unprotected. As he zooms at the end of his dive, he may offer an easy target

HART

to the enemy gunner. These drawbacks do not exist in a two-seater fighter; but for long the problem was to find one with sufficient speed and manoeuvrability. The "Hart" has satisfied these requirements, and, last year, one flight of No. 23 (Fighter) Squadron at Kenley was equipped with fighter "Harts" as an experiment. They proved so successful that it has been decided to equip the whole squadron as a two-seater fighter unit.

DAY BOMBERS

SINGLE ENGINE

IN this country all the bomber squadrons belong to the command Air Defence of Great Britain, and are administered by the Wessex Bombing Area and by No. 1 Air Defence Group. The bombers are divided into two classes, day bombers and night bombers. The day bombers are again subdivided into those with one engine and those with two engines. The squadrons of the Wessex Bombing Area are all regulars, while those of No. 1 Air Defence Group are mostly composed of civilian personnel. In the Cadre squadrons one flight is composed of regulars and the rest of Special Reserve personnel; while in the Auxiliary Air Force there is only a small regular nucleus in each squadron.

FAIREY III F GORDON HART WAPITI

Considering first the squadrons of single-engined day bombers in Great Britain, we find that there are seven such squadrons in the Wessex Bombing Area, namely, Nos. 12, 33, 57 and 18 B.S., which are equipped with the Hawker "Hart," No. 40 B.S. with the Fairey "Gordon," and the two squadrons at Bircham Newton, Nos. 35 and 207 B.S., with the Fairey III F. These last two will soon receive the "Gordon" as replacement for the III F. In the Air Defence Group, one Cadre squadron, No. 501 (City of Bristol) B.S., and all the eight squadrons of the Auxiliary Air Force use the Westland "Wapiti"; while No. 504 (County of Nottingham) B.S., which is a Cadre Squadron, uses the Hawker "Horsley."

As was mentioned in the introductory article, we are not showing any machines under the heading "General Purpose Aeroplanes." To designers, the Fairey III F, the "Gordon" and the "Wapiti" are all known as G.P. machines, and it would only be logical to place the "Hart" in the same category. But when these machines are supplied to squadrons they become definitely either day bombers or Army co-operation machines, or serve some other purpose, such as communications or fleet spotting.

In India the "Wapiti" is sometimes an army co-operation machine and sometimes a day bomber. In this country it is only a day bomber. In this section we give photographs of the "Hart," the III F, "Gordon" and "Wapiti." The "Horsley" is used by one Cadre Squadron as a day bomber, but it will probably soon

be replaced by another type. A photograph of this type will be found in the section of Coast Defence squadrons, as it is used as a torpedo-plane by No. 100 Squadron.

In time of war, day bombers may prove to be the most effective class of aircraft in helping to win victory for their nation. As they fly by day, a high degree of accuracy in bombing is expected of them. They also run special risks, for they are never hidden from the enemy by the darkness of night. Clouds may conceal them on their way towards their objective, but clouds may also hamper them in their bomb aiming and so render their work ineffective. It must be remembered that a bomb which misses its mark is sheer waste. To destroy residential houses in the neighbourhood of the target will probably infuriate the enemy but will not help to defeat him. The bomber squadrons must, therefore, need to keep resolutely on their course, intent only on reaching their target and taking good aim at it. They may alter their course so as to take advantage of clouds for concealment. When attacked by anti-aircraft artillery, they will probably have to zig-zag in order to throw the guns off the mark but they must never lose formation. Frequently they will be attacked by fighters, who will be superior to them in speed and in manoeuvrability. Then it is a matter of life and death for the bombers to keep formation. They are two-seaters, and the men in the rear seats must be expert gunners. The fighters will attack from behind, and they will have the initiative in choosing the time and manner of launching the



HAWKER
HART FIGHTER

(Rolls-Royce "Kestrel")

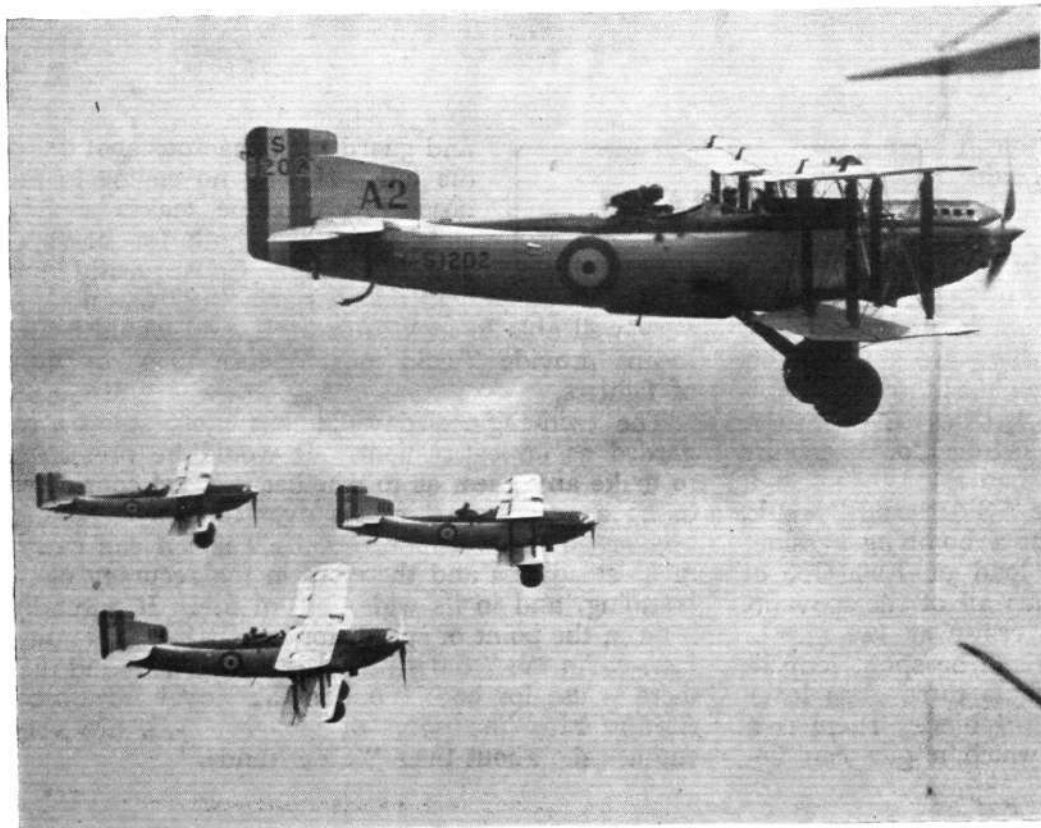
Wing Area, 347 sq. ft.

Gross Weight, 4,196 lb.

Maximum Speed at 13,000 ft.,
185.5 m.p.h.

Used by No. 23 (Fighter
Squadron.

(FLIGHT Photo.)



FAIREY

III F

(Napier "Lion")

Wing Area, 444 sq. ft.

Gross Weight, 6,041 lb.

Maximum Speed at 10,000 ft.,
128 m.p.h.

Endurance with Service Load
at Top Speed, 3 hr.

At Economical Cruising Speed,
4.2 hr.

Used by Nos. 24, 35, 207, 14, 8,
45, and 47 Squadrons.

(FLIGHT Photo.)



FAIREY

GORDON

(Armstrong-Siddeley
"Panther")

Wing Area, 445 sq. ft.

Gross Weight, 5,906 lb.

Maximum speed at 10,000 ft.,
132 m.p.h.

Used by Nos. 6 and 40
(Bomber) Squadrons.

(FLIGHT Photo.)

THE AIRCRAFT OF THE R.A.F.

DAY BOMBERS

SINGLE ENGINE—(Continued)

attack. The bombers have no initiative in the matter, for they must keep on their course. The assaults of the fighters must be met by the cross-fire of the guns in the rear cockpits of the gunners. These gunners need to be very cool, quick and resolute. They are not protected (as the fighter pilot is) by a mass of metal in front of their bodies. They have to stand up in their cockpits and swing their guns with the utmost speed on to the diving fighters. A bomber that loses formation is probably a lost

machine, for under the tail there is a blind spot not covered by the fire of the rear gunner, and the fighters can attack there. But while all nine machines keep their formation, the blind spot under each machine is covered by the fire from another machine, and the fighters should find the squadron a tough nut to crack.

A day bomber needs speed, high ceiling, fairly long range and the power of carrying at least 500 lbs. of bombs.

TWIN ENGINE

THERE is only one squadron in the R.A.F. which uses twin-engined day bombers. This is No. 101 B.S. at Andover, and the machine which it uses is the Boulton & Paul "Sidestrand" with two "Jupiter" engines. In a squadron of single-engined day bombers there are three flights and each flight has four machines, though it normally works with only three. In No. 101 B.S. there are only two flights, each of which has four machines but seldom works with more than three. In fact it is probable that in war a single "Sidestrand" would often be sent out to carry out a bombing mission. Carrying a crew of four, a load of 1,000 lb. of bombs, and three machine-guns all of the movable type, the "Sidestrand" can cruise at 120 m.p.h. It is very manoeuvrable, and can be spun, looped, and rolled like a fighter, and its three guns leave very few blind spots on the machine. There is a port in the bottom through which a gun can fire

SIDESTRAND

and guard the dangerous spot under the tail. Having no engine in the nose, this machine makes a very steady platform both for bombing and for firing. Consequently it is held that a single "Sidestrand" is

very well able to look after itself, and would by no means provide "cold meat" even to a squadron of fighters.

The twin-engined day bomber must still be regarded as an experiment. It would be premature to make any guess as to whether it is yet considered to be a success. It scores over the single-engined bomber in the weight of bombs which it can carry, in its steadiness and therefore in the accuracy of its bombing, and in its wide field of fire. It naturally loses in the point of speed, for the "Hart" is much faster than the "Sidestrand." It may be found that there is use for both types in the Royal Air Force. At any rate, the pilots of No. 101 B.S. are very enthusiastic about their "Sidestrands."

NIGHT BOMBERS

NIGHT bombers are always multi-engined machines.

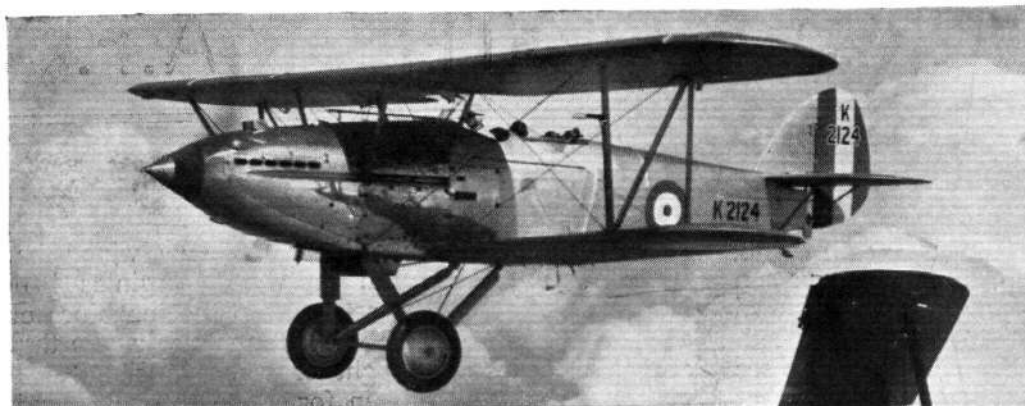
They are painted a dark greenish colour, and the white ring is omitted from the national markings on them, so that there shall be nothing to make them unduly conspicuous. Formation flying at night is an impossibility, for it would speedily lead to collisions, so night bombers must work alone. They must be self-contained machines, and when attacked they must be able to defend themselves without hoping for help from any consort. The most desirable quality in a night bomber is that it should be able to carry a heavy weight of bombs. Long range is another very necessary quality, and speed is a desideratum, though other qualities must not be sacrificed in order to increase the speed. That the machines should be easy to land at night goes without saying. They must also be well provided

HINAIDI HYDERABAD VIRGINIA

with machine guns, for meeting attacks by fighters.

The greatest friend which night bombers hope to find is a night with enough clouds, but not too much. They want clouds which will hide the machine as it makes its way to the target, but they want the target itself to be clearly distinguish-

able. The greatest enemies of the night bombers are the sound-locators and the searchlights. If they can escape the notice of these two instruments of defence, there is very little chance that they will be worried by guns or by fighters. If the searchlights pick the night bombers up, or even form a pyramid of beams near them, the sentinel fighters are sure to fly up to the spot, and the chances are that they will soon spot the bomber, possibly by the flames from its exhaust. Then the fight begins, and the odds should be heavily on the side of the fighter. The bomber



(above) **HAWKER
HART BOMBER**

(Rolls-Royce "Kestrel")

Wing Area, 347 sq. ft.; Gross Wt., 4,617 lb.; Max. Speed at 15,000 ft. 152 m.p.h.; Endurance with Service Load at Top Speed, 3 hr.; at Economical Cruising Speed, 4.4 hr.

Used by Nos. 12, 18, 33, 57, 11 and 39 (Bomber) Squadrons.



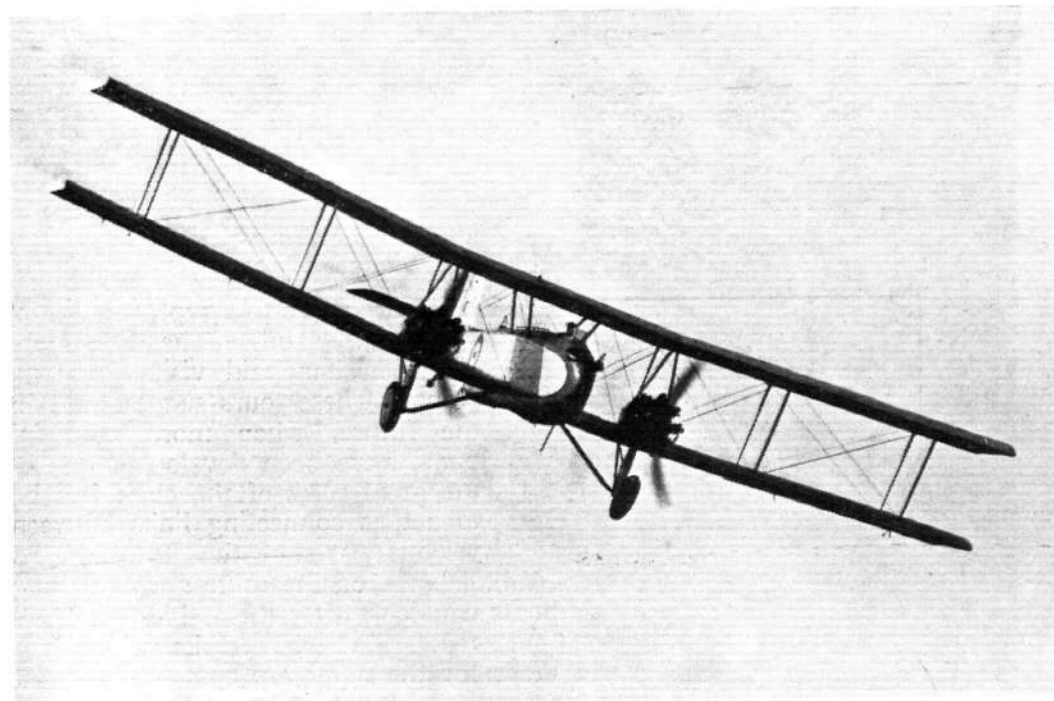
(below) **WESTLAND
WAPITI**

(Bristol "Jupiter")

Wing Area, 488.6 sq. ft.; Gross Wt., 5,273 lb.; Max. Spd. at 15,000 ft., 122 m.p.h.; Endurance with Service Load at Top Speed, 2.4 hr.; at Economical Cruising Speed, 3.4 hr.

(FLIGHT Photo.)

Wapiti used by Nos. 30, 55, 84, 5, 20, 27, 28, 31, 60, 501, 600, 601, 602, 603, 604, 605, 607 and 608 Squadrons.



**BOULTON & PAUL
SIDESTRAND III**

(2 Bristol "Jupiter")

Wing Area, 957 sq. ft.

Gross Weight, 9,963 lb.

Maximum Speed at 10,000 ft., 134 m.p.h.

Endurance with Service Load at Top Speed, 4 hr.

At Economical Cruising Speed, 4.6 hr.

Used by No. 101 (Bomber) Squadron.

(FLIGHT Photo.)



**HANDLEY PAGE
HINAIDI**

(2 Bristol "Jupiter")

Wing Area, 1,467 sq. ft.

Gross Weight, 12,993 lb.

Maximum Speed at 10,000 ft., 109 m.p.h.

Endurance with Service Load at Top Speed, 4.6 hr.

At Economical Cruising Speed, 6.5 hr.

Used by Nos. 10 and 99 (Bomber) Squadrons.

(FLIGHT Photo.)

THE AIRCRAFT OF THE R.A.F.

NIGHT BOMBERS—(continued)

must keep more or less on its course, though trying to escape from the dreaded beams. The fighter can manoeuvre round in the dark and choose its own moment for delivering an attack at tremendous speed. The gunners in the bomber will rarely be able to see the assailant until the very last moment, and by that time it may be too late. The fighter's bullets may have done their work, and nothing may remain for the crew of the bomber but to take to their parachutes and hope for a soft landing in the dark.

Though night bombing is the normal work of these heavy machines, they may sometimes be used very effectively by day for long-range bombing. This was done during the Air Exercises of 1930, when one of the commanders took his enemy by surprise by sending two squadrons of "Virginias" round the flank of his position by day. The route was too long for a day bomber to have followed it, but it was within the range of the "Virginias."

The "automatic pilot" is a device which has been found very useful on the "Virginias" of No. 7 B.S. It can be set to keep the machines on a given course when the pilots cannot see where they are going, either by night or when in clouds. It makes it possible to fly in formation through clouds by day without risk of collision.

There are three types of night bomber at present in use in the Royal Air Force.

The "Virginia" carries a load of some 2,000 lb. of bombs, but it is a slow machine. The "Hyderabad" is faster but carries a smaller load of bombs. The "Hinaiidi" is much the same machine as the "Hyderabad," but has air-cooled engines and is constructed of metal. The "Virginia" is used by Nos. 7, 9, 58 and 500 Bomber Squadrons; the "Hyderabad" by Nos. 502 and 503 B.S. (both Cadre squadrons); and the "Hinaiidi" by Nos. 10 and 99 B.S.

COAST DEFENCE

FLYING BOATS

THE flying boat squadrons are unique. It is difficult to say where their work now begins and ends, and it is quite impossible to foretell where their work will stop in the future. Fighters and bombers have fairly well-defined functions, but flying boats are craft of tremendous possibilities which so far have not been even half explored. In the Great War the flying boats from Felixstowe and Great Yarmouth kept up a constant patrol of the North Sea. They wrought the destruction of not a few submarines, they shot down three Zeppelins in flames; and they engaged in some stout fights with German float-planes. Now they patrol the narrow seas round the British Isles, round Malta, in the Persian Gulf, and round Singapore. Though there is no fighting to be done, the boats sometimes give active help to the fishery department, and have been able to spot foreign poaching vessels. They can also give help to wrecked vessels, and generally act as a sort of benevolent sea police.

The flying boats sometimes accompany the fleet to sea, and then their long range would enable them to search for a hostile fleet at a distance outside the range of the ship-planes from the aircraft carriers. In the main, however, their rôle is offensive action rather than reconnaissance, for the latter can usually be carried out by lighter and cheaper aircraft. Flying boats have also undertaken a number of long cruises, of which the most notable was that of No. 205 F.B. Squadron (Supermarine "Southampton") from Plymouth to Australia, and back to Singapore, where the squadron has now taken up its abode. Boats

IRIS
RANGOON
SOUTHAMPTON

have also flown to Egypt, the Baltic, and to Iceland. The Singapore squadron has paid visits to Hong Kong. These tours suggest that in the future, when more powerful boats have been developed, one of the great rôles of the class will be to act as connecting links between various parts of the Empire. So

long as re-fuelling bases on the route are available, the flying boats can look after themselves, and are quite self-contained. Sheltered creeks where the boats can moor for the night are common in most parts of the Empire.

These various functions and possibilities suggest to some authorities that in the future two distinct classes of flying boat should be evolved. The boat needed for use round the British coasts should have a comparatively high speed. As the waters are full of shipping, and as there are numerous bays where the water is sheltered, it is thought that this Home type of boat might sacrifice a degree of seaworthiness in order to gain extra speed in the air. The Empire type of boat would have to reverse the importance of these qualities. Range and seaworthiness would be more important than speed. It might, for example, be necessary to reinforce Singapore from Great Britain, without entering any foreign port to re-fuel. That would mean that the first flight would be non-stop from Plymouth to Gibraltar, and the next on to Malta, and so on. Range is all-important for boats of that class, and they must also be able to get off the water with a very heavy load of petrol. In the future the usual thing may be for a boat to take off with a comparatively light load, and then

HANDLEY PAGE
HYDERABAD

(2 Napier "Lion")

Wing Area, 1,427 sq. ft.
Gross Weight 13,535 lb.
Maximum Speed at 10,000 ft.,
109 m.p.h.
Endurance with Service Load
at Top Speed, 5.5 hr.
At Economical Cruising Speed,
7.2 hr.
Used by No. 504 (Bomber
Squadron.

(FLIGHT Photo.)

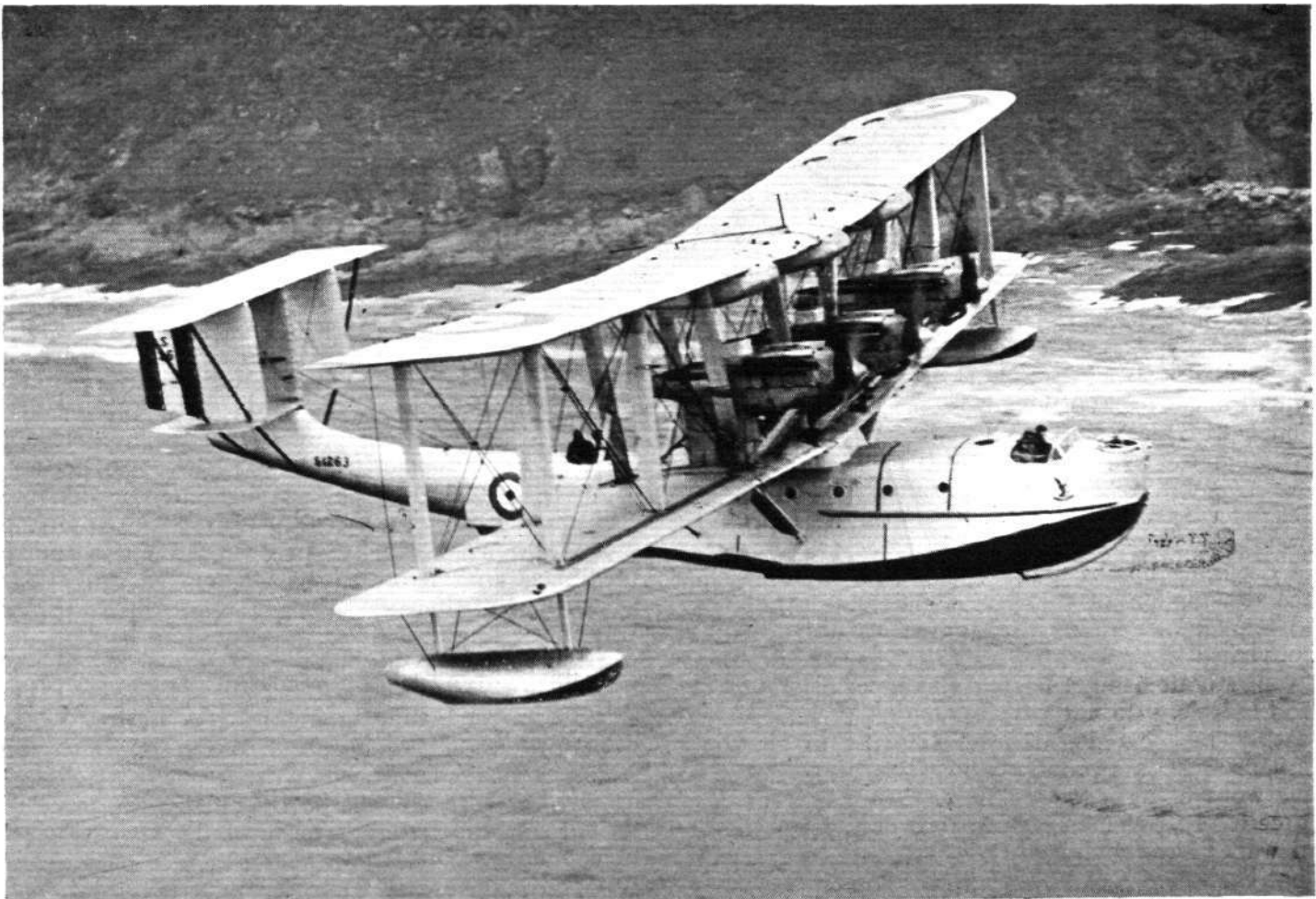
VICKERS
VIRGINIA Mark X

(2 Napier "Lion")

Wing Area, 2,184 sq. ft.
Gross Weight, 17,954 lb.
Maximum Speed at 5,000 ft.,
93.5 m.p.h.
Endurance with Service Load
at Top Speed, 8.9 hr.
At Economical Cruising Speed,
12.7 hr.

(FLIGHT Photo.)

Used by Nos. 7, 9, 58, 500 and 502 (Bomber) Squadrons.



BLACKBURN
IRIS III

(3 Rolls-Royce "Condor")

Wing Area, 2,411 sq. ft.
Gross Weight, 29,380 lb.

Used by No. 209 (Flying Boat) Squadron.

Maximum Speed at 1,500 ft.,
118 m.p.h.
Endurance with Service Load
at Top Speed, 7.05 hr.
At Economical Cruising Speed
10.3 hr. (FLIGHT Photo.)

THE AIRCRAFT OF THE R.A.F.

COAST DEFENCE

FLYING BOATS—(Continued)

fuel in the air from another machine, but that is only a future possibility.

Our policy as regards flying boats has been gradual development. A deliberate policy has been adopted of increasing the size and power by successive steps, and digesting the lessons learnt from each step before proceeding to build something larger. The German designer, Dr. Dornier, adopted a different policy, making one very long jump to the great size of the Do. X. We still believe that our method is giving the better results. When we arrive at the stage of building a boat of the same size as the Do. X, we hope that our boat will be a much more useful craft than the German giant has proved itself to be.

Of course, other things being equal, greater size means greater seaworthiness; a little cockleshell will be swamped by a sea which will not disturb a Cunarder, and so the larger the flying boat the more seaworthy it will be. Moreover, up to a point, and that point has not yet been definitely fixed, greater size means longer range. Of the three types of boat now used as standard equipment in the R.A.F., none has the power to fly regularly non-stop between Plymouth and Gibraltar, though perhaps the "Iris" might be able to make the flight in special circumstances.

It is no secret that the Air Ministry is on the look-

out for a new type of flying boat to issue to some of the squadrons. A new squadron, No. 210, has recently been re-formed and stationed at Pembroke Dock. At present it is using some "Southamptons" which have been returned by the squadron at Basra, in Iraq, but this is only regarded as temporary equipment, and in the Air Force List no type is given as belonging to this squadron. Three types are now in use, all of which are very good of their kind, but none of which represents the latest ideas of the designers. The Supermarine "Southampton," with two Napier "Lions" is used by No. 201 F.B. Squadron at Calshot, No. 204 F.B.S. at Mount Batten (Plymouth) and No. 205 F.B.S. at Singapore. The type has been in service for many years, and when first produced it was well ahead of its time. It is now regarded as too slow. The Blackburn "Iris," with three Rolls Royce "Condors," is a newer and faster type, with a very pronounced V-shaped section of the hull. This is regarded by some as a great advantage, and by others as a drawback. It enables a boat to land gently in a heavy sea, but makes it a little harder to take off. The "Iris" is used by No. 209 F.B.S. at Mount Batten. The Short "Rangoon," with three "Jupiters," is a good boat, though its cruising speed is on the slow side. It is used by No. 203 F.B.S. at Basra.

TORPEDO-PLANES

NO 36 SQUADRON, stationed at Singapore, is known officially as a Torpedo-Bomber Squadron. No. 100 Squadron, stationed at Donibristle, in Fife, not far from the banks of the Firth of Forth, is described in the Air Force List as a Bomber Squadron. Yet both the squadrons use the Hawker "Horsley" for the two purposes of dropping bombs and launching torpedoes. Why the designation of the two is different is not easy to explain. Perhaps the authorities are not quite convinced in their own minds that torpedo-dropping from aircraft has got beyond the experimental stage, and therefore do not wish to commit themselves too deeply by changing the official title of the only squadron in this country which has been trained in the work of torpedoing a fleet. The Fleet Air Arm is certainly prepared to use torpedoes from the air in war, as we shall see when we come to deal with that branch of R.A.F. activities. The circumstances of a coast defence squadron and of ship-planes on an aircraft carrier are not at all the same, and it cannot be assumed that what is good tactics for one may be equally good for the other.

As torpedo-aircraft from a shore base may be considered as experimental it is obviously difficult to

HORSLEY VILDEBEEST

write much about them. Various ways have been suggested in which torpedo attacks from the air may be launched against enemy ships. Smoke screens have been suggested as a preliminary to the torpedo attack. One suggestion is that the

torpedo-planes should fly low in their approach behind the smoke screen, or even without a smoke screen, as aircraft are less easily spotted when near the surface of the water than they are when the sky is a background. Another suggestion is that the torpedo-planes should approach at a great height and then dive suddenly to within a few feet above the water before releasing their torpedoes. In any case the machines must only be a few feet above the water at the moment when the torpedo is released or else the torpedo will be broken by the force of its fall into the water. The machine must fly level and straight for a certain short distance only a few feet above the water while the pilot takes aim and then releases the torpedo. As soon as it is released, the aeroplane will naturally do all that it can to escape from the attentions of the anti-aircraft defences of the ships. The attack would be delivered by several aeroplanes simultaneously. They would perhaps approach the enemy in formation, but when

SHORT

RANGOON

(3 Bristol "Jupiter")

Wing Area, 1,810 sq. ft.
Gross Weight, 23,302 lb.
Maximum Speed at 5,000 ft.,
108 m.p.h.
Endurance with Service Load
at Top Speed, 6.4 hr.
At Economical Cruising Speed,
8.4 hr.

(FLIGHT Photo.)

SUPERMARINE SOUTHAMPTON

(2 Napier "Lion")

Wing Area, 1,448 sq. ft.
Gross Weight, 14,600 lb.
Maximum Speed at 5,000 ft.,
102 m.p.h.
Endurance with Service Load
at Top Speed, 4.7 hr.
At Economical Cruising Speed,
6.4 hr.
Used by Nos. 201, 204, 205
and 210 (Flying Boat)
Squadrons.

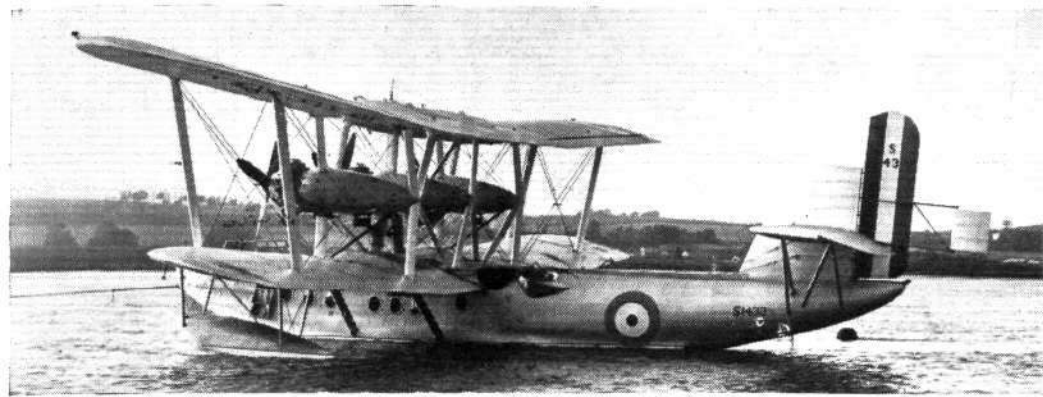
(FLIGHT Photo.)

HAWKER HORSLEY TORPEDOPLANE

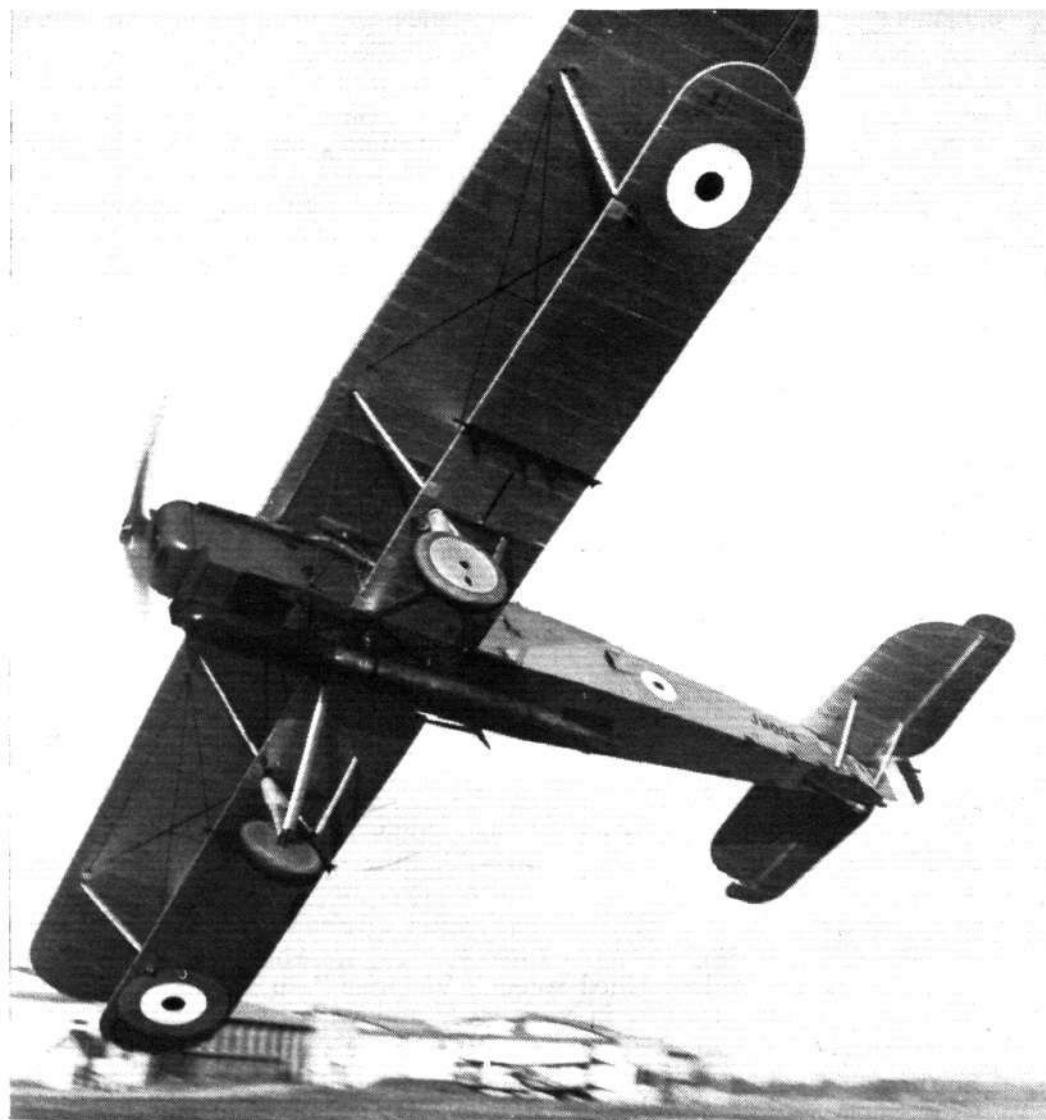
(Rolls-Royce "Condor")

Wing Area, 696 sq. ft.
Gross Weight, 9,394 lb.
Maximum Speed at 6,500 ft.,
125 m.p.h.
Endurance with Service Load
at Top Speed, 4.3 hr.
At Economical Cruising Speed,
6.35 hr.
Used by Nos. 36 and 100
Squadrons.

(FLIGHT Photo.)



Used by No. 203 (Flying Boat) Squadron.



THE AIRCRAFT OF THE R.A.F.

COAST DEFENCE

TORPEDO PLANES—(Continued)

about to attack they would certainly break formation, and each machine would act independently until it had released its torpedo. One suggestion is that an attack should be made by bombers and torpedoes at the same time, so that the dropping of the bombs from overhead should attract the attention of the fleet anti-aircraft gunners and allow the torpedo attack to come as a surprise. For this reason the two land-plane squadrons which use torpedoes are also practised in dropping bombs, and each retains the title of Bomber.

The Hawker "Horsley," with Rolls Royce 650-h.p. "Condor" engine, is the equipment of No. 100 (Bomber) Squadron at Donibristle, in Fife, and also of No. 36 (Torpedo-Bomber) Squadron, which is stationed at Singapore. The "Horsley" is a very fine aeroplane which, a few years ago, was

the standard day-bomber of the Wessex Bombing Area. It is still used as a day-bomber by one Cadre squadron, No. 504 (County of Nottingham) B.S. Its great weight-carrying capacity led to its being chosen as the machine with which the first three attempts were made to fly non-stop to India by Flight Lieut. Carr.

Some foreign countries also use the "Horsley" in their flying corps.

It has been decided that No. 100 B.S. shall be re-equipped with the Vickers "Vildebeest" with Bristol "Pegasus" engine as a bomber and torpedo-plane. The change will be carried out in the course of the present summer. The "Vildebeest" is a modern design, and the machine has a very fine performance. It will be heartily welcomed as a new type of R.A.F. equipment.

FLOAT-PLANES

THERE is only one squadron in the Royal Air Force which is equipped with float-planes, or seaplanes with twin floats. This is No. 202 (Flying Boat) Squadron, stationed at Malta. It is officially called a Flying Boat Squadron, and it is intended to have flying boats. The Air Force List states that the equipment of this squadron with float-planes is only temporary. The type in use is the Fairey III F fitted with twin floats. The III F most certainly is well called a General Purpose aeroplane. We have already seen it as a day bomber, and it is also much used by No. 24 (Communications) Squadron. In the Fleet Air Arm it is used as Spotter Reconnaissance machine. Now we see it as a seaplane. In this metamorphosis it is also much used on warships (not on aircraft carriers, which do not carry seaplanes) and is launched by catapult, as was described in the issue of FLIGHT of June 17.

FAIRY III F

In the hands of No. 202 F.B.S. the Fairey seaplane has done some very useful work in the Mediterranean. For those who would like further information on this subject, we may mention an article in the

last April issue of the *Royal Air Force Quarterly*, in which an account is given of a cruise by six seaplanes of this squadron from Malta to Aboukir and back.

Nevertheless, it cannot be called a satisfactory state of affairs that a regular squadron should be left for long with a type of aircraft which is admittedly only temporary equipment. The fact is, and it is not denied, that the Air Ministry is on the lookout for new types of flying boat. The designers are busy, and several specimens have already been tried out. Before long we feel sure that more than one new type will be adopted, and then No. 202 F.B.S. will become a flying boat squadron in reality as well as in name.

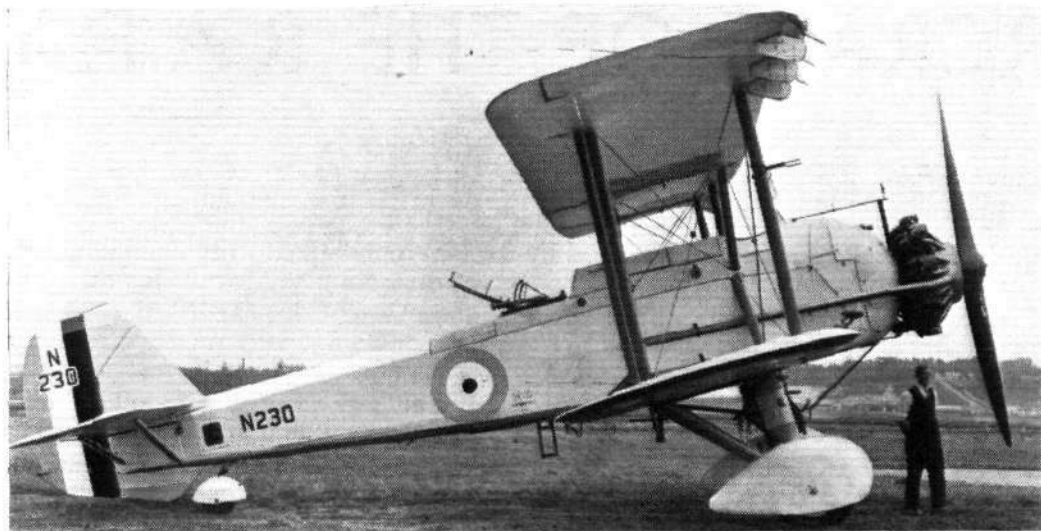
TROOP CARRIERS

EVERYONE will remember the excitement aroused a few years ago by the revolution in Afghanistan when it was feared that the British Resident and other foreigners might be in danger. The crisis occurred at the height of winter when the passes between India and Afghanistan were mostly blocked by snow. It was felt that as a precaution the foreigners ought to be evacuated without delay, and not only the British subjects. This could only be done by the use of aeroplanes. The Air Force in India commenced operations with some Bristol Fighters, but as they are only two-seaters they could

CLIVE
VICTORIA

not do much. Meanwhile urgent appeals for reinforcement were sent to the R.A.F. in Iraq. At the station of Hinaidi outside Baghdad there is No. 70 (Bomber Transport) Squadron, which is equipped with the Vickers "Victoria" troop-carrier, driven by

two Napier "Lion" engines. This squadron at once despatched some "Victorias" to India where they arrived in two days, and without delay they commenced to fly over the passes of the North-West Frontier hills and to land near the Residency at Kabul. The Afghans were not in the least unfriendly, and the aeroplanes were not molested. A number



VICKERS

VILDEBEEST

(Bristol "Pegasus I")

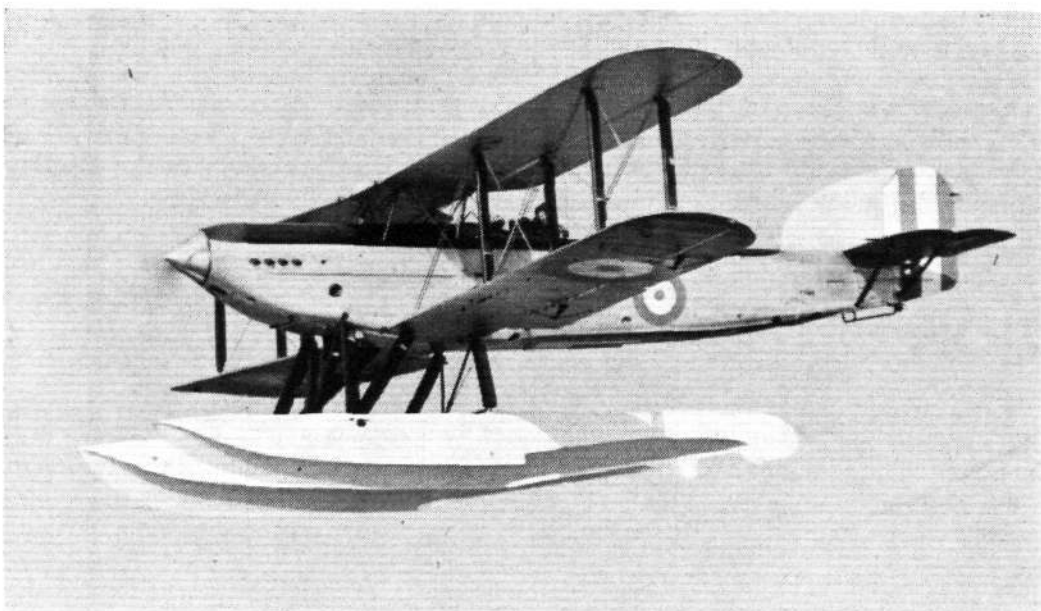
Wing Area, 728 sq. ft.

Gross Weight, 7,955 lb.

Maximum Speed at 10,000 ft.,
145 m.p.h. (estimated)

Endurance with Service Load
at Top Speed, 3.5 hr.

To be used by No. 100 (Bomber)
Squadron.



FAIREY

III F SEAPLANE

(Napier "Lion")

Wing Area, 438.5 sq. ft.

Gross Weight, 6,398 lb.

Maximum Speed at 8,000 ft.,
122 m.p.h.

Endurance with Service Load
at Top Speed, 3.4 hr.

At Economical Cruising Speed,
4.4 hr.

Used by No. 202 (Flying Boat)
Squadron.

(FLIGHT Photo.)



HANDLEY PAGE

CLIVE

(2 Bristol "Jupiter")

Used by Bomber Transport
Flight, India.

Wing Area, 1,480 sq. ft.

Gross Weight, 14,500 lb.

Maximum Speed at 4,000 ft.
111 m.p.h.

(FLIGHT Photo.)

THE AIRCRAFT OF THE R.A.F.

TROOP CARRIERS—(Continued)

of trips were made and all the foreigners in Kabul, of all nationalities to the number of some 300, were safely transported to India and safety. A "Victoria" will carry 22 troops with their equipment, and this feat of evacuating the foreigners from Kabul drew attention to the varied uses to which heavy transport aircraft can be put. It also showed how rapidly the Royal Air Force in one country can come to the assistance of another country. It was felt, however, that it would be wise for India to possess some transport aircraft of her own. No new squadron was formed, but a flight, known as the Bomber Transport Flight, India, was instituted and stationed at Lahore. It was given two Handley Page "Clives," with two "Jupiter" engines, but probably a new type will be supplied before long.

The other Bomber Transport Squadron is No. 216, and it is stationed at Heliopolis, outside Cairo. In 1931 this squadron was given the task of making the annual Service flight from Cairo to Capetown and

back, and on the way it took part in some manoeuvres with regiments of the King's African Rifles. The original idea of these squadrons is that they should be able to move parties of troops rapidly from one place to another in times of emergency. More recently, during the outbreak in Cyprus, some "Victorias" of this squadron were used to carry parties of soldiers from Egypt to the scene of the rioting, where they were urgently needed.

Of course, the use of these heavy transport machines could be extended to moving many other forms of freight besides refugees and soldiers. One can imagine essential parts of guns, or even parts of peaceful machinery, being carried with speed to where they were wanted.

The "Victoria," which succeeded the Vickers "Vernon," has now done good service for many years, and a new standard type of troop-carrier is to be expected before long. Visitors to the Display at Hendon may perhaps see the new type.

ARMY CO-OPERATION

ARMY co-operation is one of the most specialised and most comprehensive functions undertaken by the Royal Air Force. The Army expects a great deal from the aircraft which work with it. First and foremost, whenever the weather permits, the aircraft have to act as the eyes of the Army. For generations past it has always been the great desire of every General to know what is "on the other side of the hill." Aircraft can supply that information, and therefore they are invaluable to the General and his staff. In all except the very earliest stages of the Great War, no important military operations were attempted without previous reconnaissance of the ground by the aircraft. The aeroplanes reconnoitre in two ways, by means of the human eye and by photography. Each method requires a great deal of practice and skill on the part of the pilot and observer. In the case of visual observation, when reports are needed in a hurry, these reports have to be sent by wireless, either wireless telegraphy or radio telephony. The operation of the apparatus calls for more expert skill and knowledge. The observer, whether he be the pilot or the rear gunner, must be thoroughly trained in all things which affect the Army. He must know what to look for, and how to recognise it when he sees it. He must know what sort of information the staff most desires to get. He must, in fact, have quite a considerable knowledge of military tactics, and be able to appreciate the importance of something unexpected which he may suddenly discover.

A second very important function is observing for the artillery and signalling where each shell falls until the battery has found the target and is able to

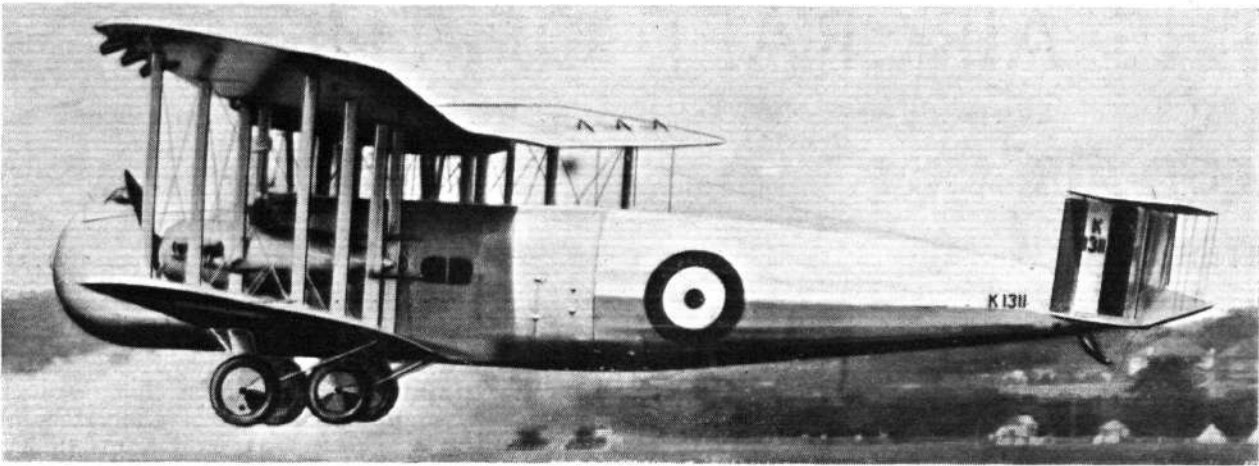
ATLAS
AUDAX

destroy it. This again is a highly specialised task, and it is most important that the R.A.F. personnel should be quite intimate with the officers of the battery with which they have to work. Each must know the character and idiosyncrasies of the other if perfect harmony in working is to be obtained. When working with the infantry, the aircraft must be able to pick up messages tied to a string stretched between two posts (rifles with the points of the bayonets stuck in the ground will serve the purpose), and for that reason each aeroplane of the Army co-operation squadrons is provided with a special hook underneath the fuselage. The airmen must be likewise expert at dropping replies close to the party of infantry which needs the information.

The Army aircraft undertake aggressive action on occasions. They can carry light bombs and also machine guns, and with them they attack parties of the enemy. The machine guns may also be needed to defend themselves if they are attacked by enemy aircraft. In fact, there is hardly any sort of Army work at which these aircraft are not expected to lend a hand, and an expert hand at that.

In Great Britain there are five Army co-operation squadrons, No. 2 stationed at Manston, No. 4 at South Farnborough, No. 13 at Netheravon, No. 16 at Old Sarum, and No. 26 at Catterick. Of these No. 4 A.C.S. is equipped with the Hawker "Audax" with Rolls-Royce "Kestrel" engine (which is one adaptation of the "Hart" day bomber), and the other four with the Armstrong-Whitworth "Atlas" with "Jaguar" engine.

There is one A.C. squadron in Egypt with the "Atlas," and three in India with the "Wapiti."



VICKERS
VICTORIA

(2 Napier "Lion")

Wing Area, 2,194 sq. ft.
Gross Weight, 19,281 lb.

Used by Nos. 70 and 216 (B.T.)
Squadrons.

Maximum Speed at 6,500 ft.,
92 m.p.h.

Endurance with Service Load
at Top Speed, 3·8 hr.

At Economical Cruising Speed,
4·3 hr.



ARMSTRONG WHITWORTH

ATLAS

(Armstrong-Siddeley
"Jaguar")

Wing Area, 392 sq. ft.

Gross Weight, 4,203 lb.

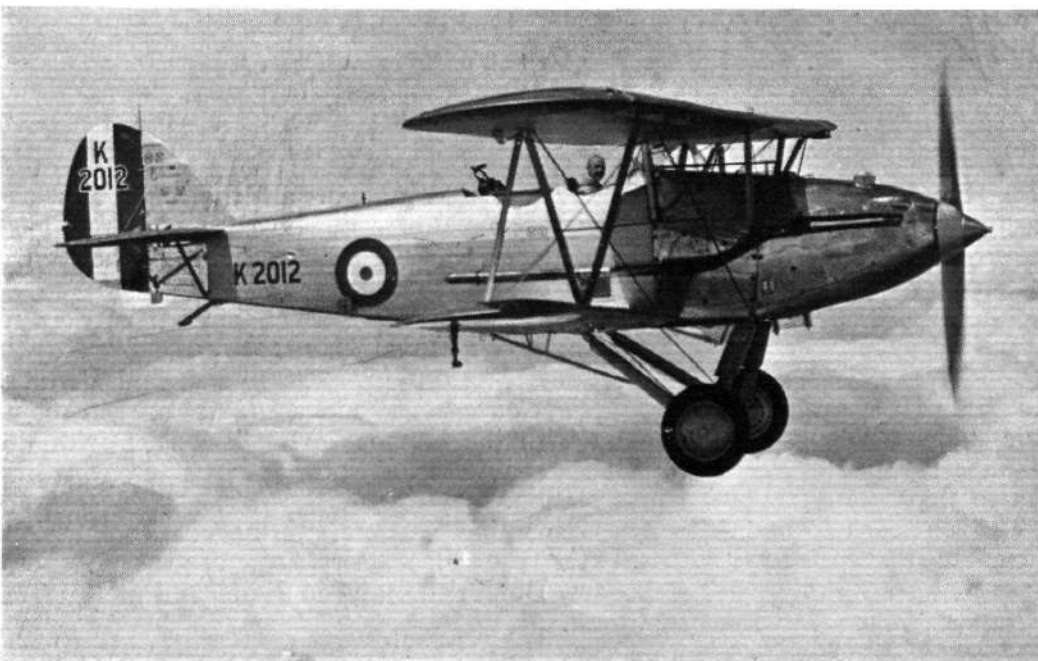
Maximum Speed at 10,000 ft.,
109 m.p.h.

Endurance with Service Load
at Top Speed, 2·75 hr.

At Economical Cruising Speed,
3·4 hr.

Used by Nos. 2, 13, 16 and 26
(Army Co-operation) and
Oxford and Cambridge Uni-
versity Squadrons.

(Flight Photo.)



HAWKER

AUDAX

(Rolls-Royce "Kestrel")

Wing Area, 347 sq. ft.

Gross Weight, 4,386 lb.

Maximum Speed at 15,000 ft.,
154 m.p.h.

Maximum Speed at 5,000 ft.,
169 m.p.h.

Used by No. 4 (A.C.) Squadron.

(Flight Photo.)

THE AIRCRAFT OF THE R.A.F.

THE FLEET AIR ARM

FLEET FIGHTERS

THE Fleet Air Arm consists of aeroplanes with wheeled undercarriages, which are taken to sea on board aircraft carriers, and are officially known as ship-planes. They are divided into flights, of which there are at present 27, each flight owning six machines. These flights are divided into three classes, namely fighters, spotter reconnaissance, and torpedo bombers. The machines take off from the flying deck while the ship steams into the wind, and they also land on the deck in the same conditions. The landing requires very great skill on the part of the pilot. In the flights of two-seaters all the observers are naval officers, and many of the pilots in all the flights are also naval officers who are granted temporary commissions in the Royal Air Force. These latter continue to wear their dark blue naval uniforms with a flying badge. The remainder of the pilots belong entirely to the Royal Air Force, but have been through a special course of training in working in co-operation with the fleet. To the ordinary landsman all things connected with a ship are a mystery, and this special training is very necessary for the pilots; while it is considered by the Admiralty that no one but a naval officer would be any use at all as an observer. As the captain of a carrier said recently in a lecture, at sea even sailors sometimes fail to see things which are present, and think that they have seen things which are not there at all, and a landsman would be in far worse plight than a sailor may be.

As in most forms of air work, the really useful service is done by the machines which reconnoitre and observe for the guns and by those which attack the enemy with bombs and torpedoes. But

FLYCATCHER NIMROD

neither class can carry out its work unless it gets protection from fighter aircraft. Fighters also attack the enemy machines of all classes and so prevent them from doing their work. Fighters are therefore absolutely necessary on a carrier, though they can do

very little to damage the ships of the enemy. For instance, a carrier would become useless if its flying deck were badly ploughed up by enemy bombs. It is the duty of the carrier's fighters to prevent the enemy bombers from dropping bombs on the deck, and so more or less blinding the fleet.

Nine flights of the Fleet Air Arm are called fleet fighters, and fly single-seater fighter machines. Most of them are still equipped with the Fairey "Flycatcher" with "Jaguar" engine. It is a very fine aeroplane, but it has been in use now for a number of years (the greatest testimony to its merits), and its performance has now been surpassed by later types. The "Flycatcher" is easily distinguished when in the air by the dihedral angle (*i.e.*, upward slope) of its upper planes.

This machine has often been fitted with floats, though in that form it is not used by the Fleet Air Arm, and as a seaplane it has been used a good deal for the early training of the High Speed Flights which have contested the Schneider Trophy.

The new fighter which is being introduced is known as the "Nimrod," which is a naval version of the landplane interceptor fighter "Fury." It is a product of the Hawker firm and is fitted with a Rolls-Royce "Kestrel" engine. At present only one flight, No. 408 on H.M.S. *Glorious*, has received the "Nimrod," but others will doubtless receive it before long.

FLEET SPOTTER RECONNAISSANCE

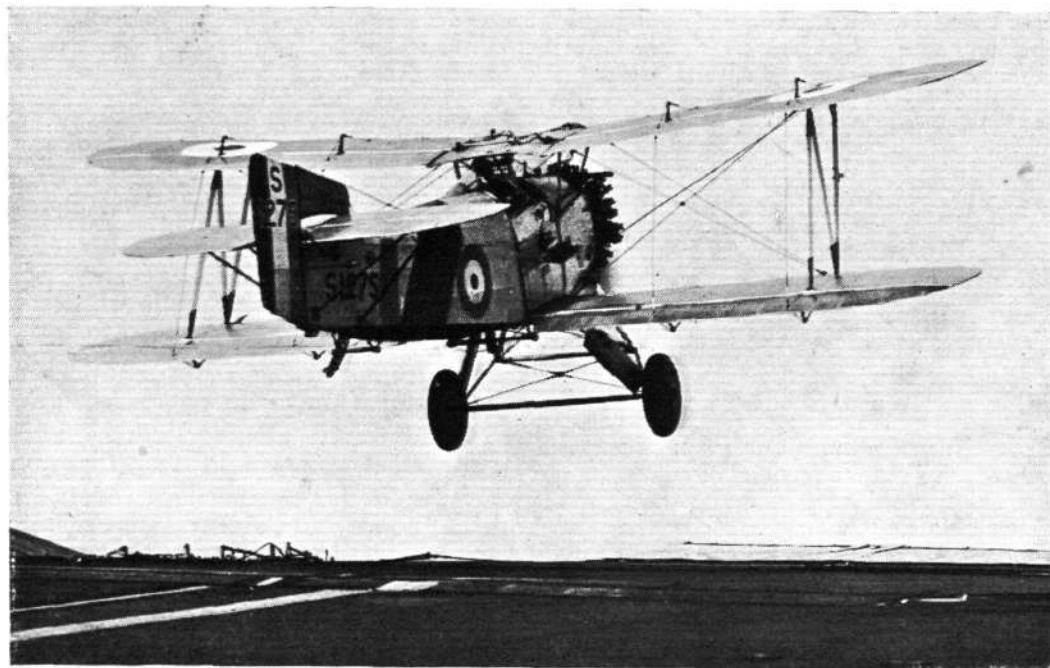
THE 11 flights known as Fleet Spotter Reconnaissance have to do all the general work for the fleet. They are expected to reconnoitre and discover the whereabouts of enemy ships if possible, and they are also required to spot for the guns. Thus the work of these flights is very similar to that of the army co-operation squadrons, with the added difficulty of landing on the deck. A two-seater machine of very varied utility is needed by these flights—in fact a General Purpose machine. The choice fell upon the Fairey IIIF, which belongs to that category, and all the spotter reconnaissance flights are equipped with it. The engine is the Napier "Lion." As

FAIREY IIIF

stated above, all the observers are naval officers who can readily recognise various classes of ships when they see them.

There are seven aircraft carriers in the Royal Navy: *Argus*, *Ark Royal*, *Courageous*, *Glorious*, *Eagle*, *Furious*, and *Hermes*. Of these *Courageous* and *Furious* are in commission with the Home Fleet, *Glorious* is with the Mediterranean Fleet, and *Hermes* is on the China station.

The remaining carriers are not in commission. Bases for the Fleet Air Arm are at Gosport, Leuchars, Donibristle, and in Malta and at Kai Tak in China.



**FAIREY
FLYCATCHER**

*(Armstrong-Siddeley
"Jaguar")*

Wing Area, 299 sq. ft.

Gross Weight, 3,078 lb.

Maximum Speed at 10,000 ft.,
138 m.p.h.

Endurance with Service Load
at Top Speed, 2.8 hr.

At Economical Cruising Speed,
3.3 hr.

Used by Nos. 401, 402, 403,
404, 405, 406 and 407 Fleet
Fighter Flights.

(Flight Photo.)



**HAWKER
NIMROD**

(Rolls-Royce "Kestrel")

Wing Area, 301 sq. ft.

Gross Weight, 3,555 lb.

Maximum Speed at 13,000 ft.,
192½ m.p.h.

Endurance with Service Load
at Top Speed, 1.15 hr.; at
Economical Cruising speed
3.7 hr.

Used by No. 408 and ordered
for No. 402 Fleet Fighter
Flight.

(Flight Photo.)



**FAIREY
III F FLEET
SPOTTER**

(Napier "Lion")

Wing Area 444 sq. ft.

Gross Weight, 6,000 lb.

Maximum Speed at 8,000 ft.,
129 m.p.h.

Endurance with Service Load
at Top Speed, 3.4 hr.

At Economical Cruising Speed,
5.4 hr.

Used by Nos. 440, 441, 442,
443, 444, 445, 446, 447, 448,
449, and 450 Fleet Spotter
Reconnaissance Flights.

(Flight Photo.)

THE AIRCRAFT OF THE R.A.F.

THE FLEET AIR ARM—(Continued)

FLEET TORPEDO BOMBERS

S EVEN flights in the Fleet Air Arm are known as Fleet Torpedo Bomber Flights. Two of them, both on H.M.S. *Courageous*, are equipped with the Blackburn "Dart," and the other five have the Blackburn "Ripon." In both these types the engine is the Napier "Lion." The "Ripon" is the more modern of the two types, though both have been in use for a number of years. Why all the flights have not been given the "Ripon" is not very easy to understand, though possibly economy may have had something to do with the retention of the older type by two flights. The "Dart" is easily recognised when in flight by what may be called the crick in its neck. The engine is dropped down below the level of the rest of the fuselage, in order to give the pilot a clear view downwards and forwards when landing on a deck, and also when aiming his machine at an enemy ship before releasing the torpedo. Different design has obviated this feature in the case of the "Ripon."

The torpedo is carried between the two wheels of the undercarriage, which is therefore of the split variety. Bomb racks are also provided, as the machines have to use both types of missile. Bombs are not likely to be carried at the same time as torpedoes, as the latter are heavy enough, and when

DART RIPON

the time comes to use torpedoes all energies must be concentrated on that object. But it is a great convenience that the same type of machine should be able to carry both types and that the same flights should be practised in the use of both. In all probability attacks with

bombs and torpedoes will often be made simultaneously, the bombers coming over first, at a great height, so as to distract the attention of the ship's defences from the torpedo-planes. In many cases, however, a pure bombing attack will be possible when the occasion would not be suitable for the use of torpedoes.

Bombing has improved in accuracy very much of recent years, and bomb sights are now very much better instruments than they were in the last years of the war. Practice bombing carried out against old warships, which are empty and controlled by wireless, have recently shown some remarkably accurate results. Until the matter is actually tested out in war (a test which no one wants to witness) it is impossible to predict the exact effect which bombing will produce in naval war. The great thing is for the British Navy to be in possession of the best possible bombing aeroplanes and the best trained men. It most certainly has them.

FLEET FIGHTER RECONNAISSANCE

T HE excellent qualities of the Hawker two-seater known to the Air Defence of Great Britain as the "Hart," which was originally produced as a two-seater day bomber, persuaded the Fighting Area to go back to the idea of a two-seater fighter aeroplane. The Fleet Air Arm has also decided to use the same type as a two-seater fighter, and when used as a ship-plane the machine is named the "Osprey." It varies in certain details from the bomber "Hart," the fighter "Hart," and the "Audax," having been adapted for the special conditions of work on a carrier. The engine is the same as in the other versions, namely, the Rolls Royce "Kestrel." The "Osprey," however, is not regarded purely as a fighter. It is to be a machine which can be used for fighting when necessary, but also for reconnaissance. One of the chief objects for which fighter aeroplanes exist is to destroy the enemy's reconnaissance machines, so that they shall not be able to report what they have observed. If they can be destroyed before they have observed anything, so much the better. If they have taken photographs, it becomes a matter of the utmost importance to shoot them down before the plates can be got to the

OSPREY

developing room. Photography is less important on sea than it is on land, as fleets are not so stable as trench lines. In any case, reconnaissance machines must always expect to be attacked by any enemy fighters which may see

them. It is not always possible to arrange that each machine which is sent out to reconnoitre shall have an escort of friendly fighters. Therefore it is a great advantage if the scout machine (using the word "scout" in its true sense) is able to defend itself with a good chance of success. In the Great War, the reconnaissance aeroplanes were seldom able to put up any sort of effective defence against enemy fighters, and the number of B.E.2.C. and R.E.8 machines which were shot down by German fighters made melancholy reading. Chivalrous air fighters found the destruction of observation machines so easy that it became distasteful to them, and they had to force themselves to do an unpleasant duty. The "Osprey" has the double qualities of being able to scout and also to fight. Its speed is such that few enemy aircraft would be able to get the better of it in a race, and in a fight it ought to be able to hold its own against most assailants. It has been decided to equip No. 420 flight with the "Osprey."



BLACKBURN

DART

(Napier "Lion")

Wing Area, 654 sq. ft.

Gross Weight, 6,330 lb.

Maximum Speed at 5,000 ft.,
102.5 m.p.h.

Endurance with Service Load
at Top Speed, 2½ hr.

Used by Nos. 463 and 464
F.T.B. Flights.

(FLIGHT Photo.)



BLACKBURN

RIPON

(Napier "Lion")

Wing Area, 677.4 sq. ft.

Gross Weight, 7,762 lb.

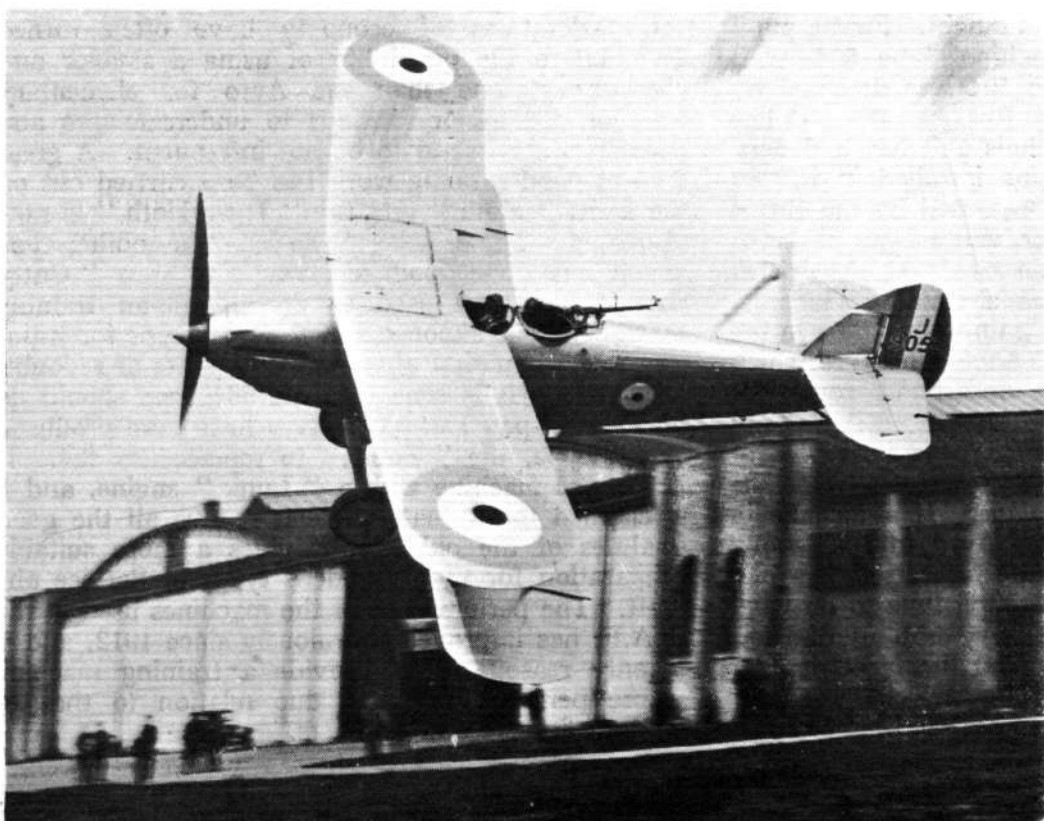
Maximum Speed at 5,000 ft.,
108 m.p.h.

Endurance with Service Load
at Top Speed, 2.45 hr.

At Economical Cruising Speed,
2.9 hr.

Used by Nos. 460, 461 and 462
F.T.B. Flights.

(FLIGHT Photo.)



HAWKER

OSPREY

(Rolls-Royce "Kestrel")

Wing Area, 346 sq. ft.

Gross Weight, 4,233 lb.

Maximum Speed at 10,000 ft.,
175 m.p.h.

Endurance with Service Load
at Top Speed, 1.75 hr. at
10,000 ft.

To be used by No. 420 (now
No. 404) Fleet Fighter Flight

(FLIGHT Photo.)

THE AIRCRAFT OF THE R.A.F.

TRAINING AIRCRAFT

HAVING discussed all the types of aircraft which are used by the operational units in the Royal Air Force, we come finally to the types which are used for training and for other miscellaneous work such as communications. We must apologise to No. 24 (Communications) Squadron for describing its work as miscellaneous. We know that that work is very important, but it is not directly concerned with fighting.

Flying training is naturally one of the most important functions of the Royal Air Force. It is, in fact, the basis of all its work. Though many a brilliant pilot has achieved fame despite having learnt to fly in the crudest of schools, still crudity in methods of instruction is not to be approved. For one thing, it costs too many lives of pupils. In the second place, it is not likely to produce a high average level of excellence. If the whole standard of flying in the Royal Air Force is to be high, it must be based upon thoroughly sound methods of teaching. What is more, the teaching in all the schools must be uniform in its methods, but constantly ready to adopt improved methods when they are discovered.

There are two ordinary channels for gaining a permanent regular commission in the Royal Air Force, namely, by passing through either the R.A.F. Cadet College at Cranwell or through the Universities of Oxford and Cambridge. At all these three institutions elementary flying is taught. First a pupil is taken up in an Avro machine, type 504, with "Lynx" engine. The Avro 504 was designed by Mr. (now Sir) Alliott Verdon Roe in 1912. It has been improved in various details and has had very many different types of engine installed in it. In the early days of the war it was used by the Royal Naval Air Service as a bomber, and a flight of Avros actually bombed the Zeppelin sheds at Friedrichshafen. Then it was used as a training machine, and it proved to be the finest training machine in the world. It had no vices, but any manoeuvre which was necessary for warlike operations could be executed in an Avro. At the same time it was not so easy to fly that the pupil gained a false idea of his own abilities, which led to disaster when he transferred to a fighter aeroplane. If a mistake in working the controls put the Avro into a wrong position, it would not necessarily right itself, but had to be righted; yet it gave the pupil time to do what was necessary and did not hurry him to disaster. In fact, the Avro may be called the most popular and most remarkable aeroplane which was ever designed. The fact that it was designed in 1912 and

AVRO LYNX
AVRO TUTOR
CUTTY SARK
GIPSY MOTH
TIGER MOTH
TOMTIT

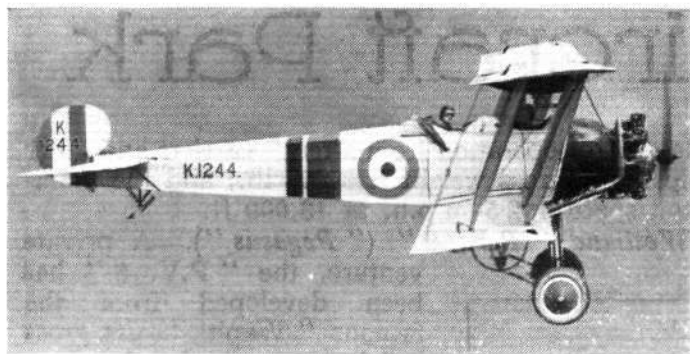
is still in use in 1932 is sufficient justification for giving such high praise as that.

If a man joins the Reserve of Air Force Officers, he is taught to fly at one of the civilian training schools approved for the purpose by the Air Ministry, where the training methods are kept closely to the lines adopted in the R.A.F. itself. If he joins the Auxiliary Air Force he is taught to fly in the squadron which he joins, under the care of the Adjutant, who is always a regular officer,

and a qualified instructor. Officers of the Special Reserve are taught at one of the civilian schools, while regular officers with short-service commissions are taught at one of the R.A.F. Flying Training Schools. The permanent officers who have learnt elementary flying at Cranwell, Oxford, or Cambridge, are also sent to a Flying Training School for further instruction before being posted to a squadron. There are four approved civilian training schools, the De Havilland school for London, the Bristol school for the West, the Blackburn school at Brough in Yorkshire, and Flying Training Services at Hamble, near Southampton. The Flying Training Schools of the R.A.F. are at Digby in Lincolnshire, Grantham also in Lincolnshire, Sealand near Chester, and Abu Sueir in Egypt. At the Flying Training Schools officers who can fly receive instruction in aerial gunnery, photography and other necessary duties. They leave these schools fully trained pilot officers.

Considerations of economy have often turned attention to the possibility of using a smaller and cheaper machine than the Avro for elementary training, for minor mishaps to undercarriages and propellers are bound to be not infrequent. A great deal of good training work has been carried out on the D.H. "Moth," and the "Tiger Moth" is now also used. The Hawker "Tomtit" is another type which has done good service. The Saro "Cutty Sark" has been used as an amphibian training machine. The exponents of the Avro type for training now admit that after so many years of redoubtable service it is time that the 504 type should go on the half-pay list. The Avro firm have produced a new type, the "Tutor," to replace the 504. It is a metal machine with a "Lynx" engine, and it is claimed for it that, while it retains all the good qualities of the old 504, it gives a more suitable preparation for flying modern types of Service aircraft. The performance of the machines used in the R.A.F. has improved enormously since 1912, and it is only reasonable to provide a training machine whose performance is in due relation to that of modern fighters and bombers.

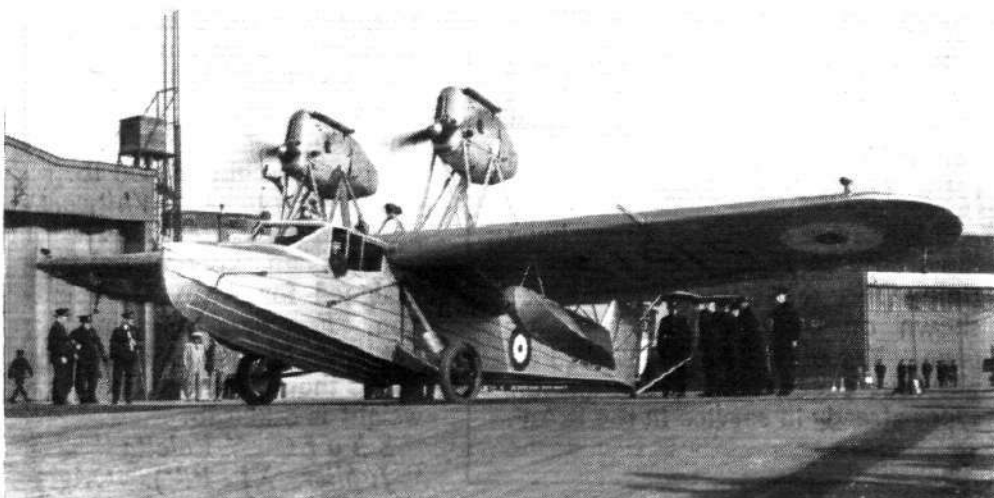




AVRO 504 : Armstrong-Siddeley "Lynx" engine.
(FLIGHT Photo.)



AVRO "TUTOR" : Armstrong-Siddeley "Mongoose" engine. The "Tutor" is now fitted as standard with the "Lynx" engine. (FLIGHT Photo.)



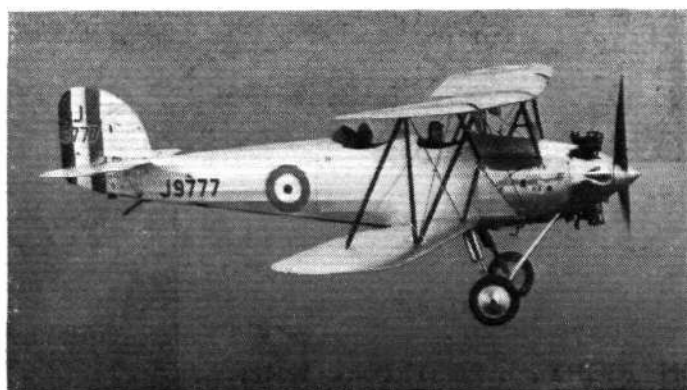
SARO "CUTTY SARK" AMPHIBIAN : Two de Havilland "Gipsy II" engines.



DE HAVILLAND "GIPSY MOTH" : "Gipsy II" engine.
(FLIGHT Photo.)



DE HAVILLAND "TIGER MOTH" : "Gipsy III" engine. (FLIGHT Photo.)



HAWKER "TOMTIT" : Armstrong-Siddeley "Mongoose" engine. (FLIGHT Photo.)

In the New Aircraft Park

NOT the least interesting feature of the R.A.F. Display will, as in previous years, be the park for new and experimental aircraft types. This park will, on June 25,

contain 15 types, many of which have not been seen in public before. We understand that this year there will be no admission to the park, so that visitors will have to content themselves with walking around it, but even so a fairly close inspection of the types should be possible.

Vickers "Jockey" ("Jupiter VII F").—This is an experimental single-seater interceptor fighter designed to operate at about 20,000 ft. The machine weighs, in flying trim, 3,250 lb., and has a speed of 210 m.p.h. at 15,000 ft.

Hawker "Osprey" ("Kestrel").—A development of the "Hart," the "Osprey" is a Fleet Fighter Reconnaissance type, adopted for operation from aircraft carriers and other ships. The machine has a gross weight of 4,600 lb. and a level speed of 175 m.p.h. at 3,000 ft.

Bristol "Bulldog III A" ("Mercury IV").—The latest development of the "Bulldog" day and night fighter, the "Bulldog III A" is fitted with the new "Mercury" engine, and has a gross weight of 3,900 lb. Its maximum speed is said to be more than 200 m.p.h.

Hawker "Nimrod" ("Kestrel").—A single-seater Fleet Fighter, the "Nimrod" is the Fleet version of the "Fury" interceptor fighter, and has been

adopted for operation from aircraft carriers and other ships. Its gross weight is 3,850 lb., and the maximum speed 192.5 m.p.h. at 13,000 ft.

Westland "P.V. 6" ("Pegasus").—A private venture, the "P.V. 6" has been developed from the famous "Wapiti." Its gross weight is, as a day bomber, 5,650 lb. No performance figures are available.

Gloster Troop Carrier (4 "Kestrels").—Designed primarily as a troop carrier, this machine is known as a bomber transport type, and carries defensive armament as well. The wing span is 95 ft., and the gross weight 28,000 lb.

Armstrong - Whitworth "Atlas II" ("Panther III").—This is an experimental type designed for Army Co-operation. Few data are available, but one of our photographs shows the machine. The gross weight is 5,300 lb.

Short "Valetta" (3 "Jupiter XI F.").—Originally designed as a twin-float seaplane, the "Valetta" has since been fitted with wheels and flown as a landplane. Gross weight, 23,000 lb. Max. speed, 137 m.p.h. at sea level.

Bristol 120 ("Pegasus").—A new General Purpose type, with the gunner housed in a transparent turret (see photo), this machine is a development of the Bristol 118. It has a gross weight of 5,200 lb.

Vickers "Vildebeest" ("Pegasus").—This is a torpedoplane and bomber, and has a crew of two. Its function is coastal defence, and the gross weight

ILLUSTRATIONS OF NEW TYPES

Space does not permit of publishing here photographs of all the types which will be on view in the New Aircraft Park.

Photographs of the following types were published in last week's issue: Gloster Troop Carrier, Boulton & Paul P.32, Handley Page H.P.38, and Fairey Night Bomber.

Most of the other types have been illustrated in FLIGHT from time to time, with the exception of those shown on this and the following page. Yet others are illustrated on previous pages, among the aircraft types already in service in the R.A.F.



ON LEFT: BLACKBURN 10-PASSENGER CIVIL BIPLANE: The two engines are "Jaguars."

(R.A.F. Official Photograph, Crown Copyright.)

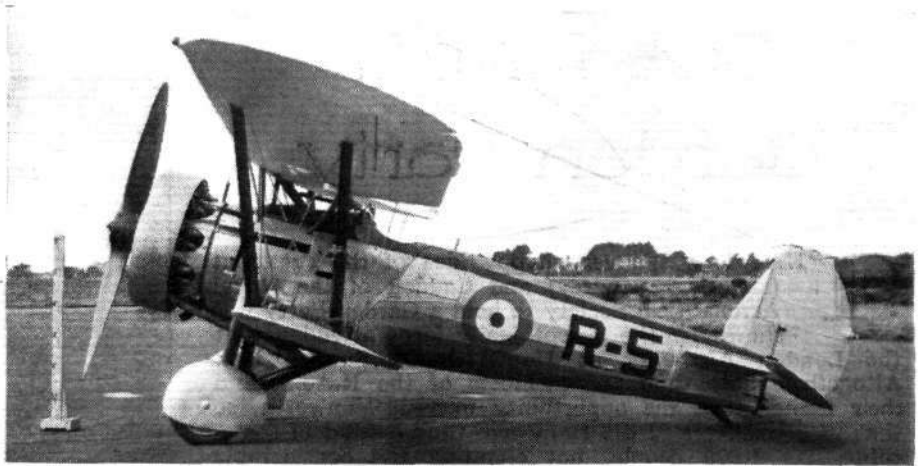
ON RIGHT: ARMSTRONG WHITWORTH "ATLAS II" ("Panther III").

(R.A.F. Official Photograph, Crown Copyright.)



ON RIGHT: BRISTOL "BULLDOG
III A" ("Mercury").

(R.A.F. Official Photograph, Crown Copyright.)



ON LEFT: BRISTOL 120
("Pegasus").

(R.A.F. Official Photograph, Crown
Copyright.)

is 7,955 lb. The maximum speed is 145 m.p.h. at 10,000 ft.

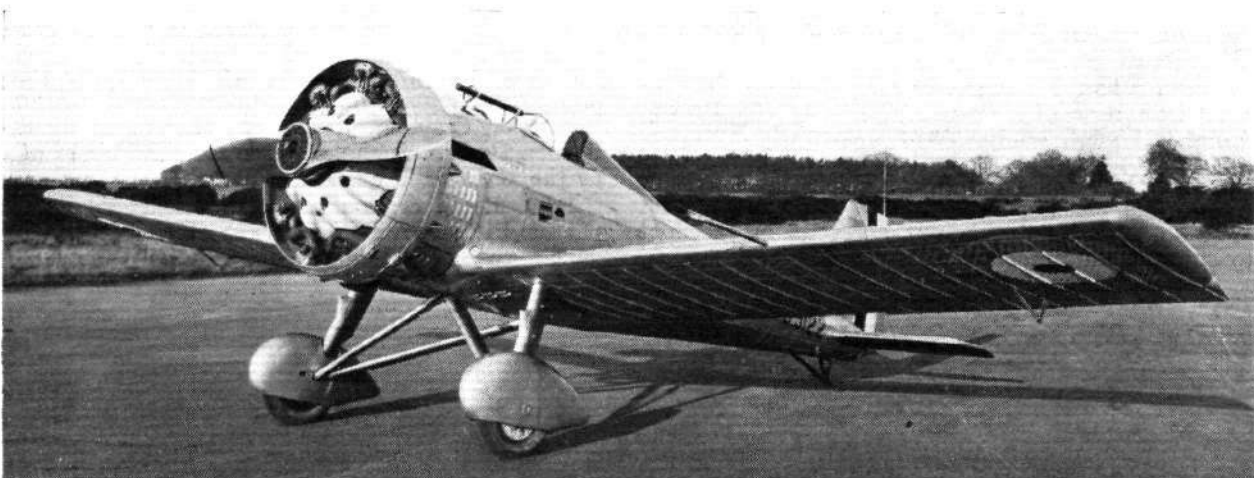
Boulton & Paul P.32 (3 "Pegasus").—An experimental night bomber carrying crew of 4. The wing span is 100 ft. and the gross weight 23,000 lb. Dual controls fitted for training purposes.

Handley Page 38 (2 "Kestrel").—A night bomber with fuselage and engines placed just under the upper wing. Gross weight, 15,600 lb.

Fairey Night Bomber (2 "Kestrel").—This is the only monoplane in the night bomber class, and has a wing span of more than 100 ft., while the gross weight is 19,050 lb.

Blackburn 10-Passenger Machine (2 "Jaguar IV C").—In the Annual Report on Civil Aviation published last October reference was made to two new Blackburn machines, of which this is one. It is a commercial aircraft for carrying 10 passengers, and is designed to operate at considerable altitudes, such as over the African Plateau. Gross weight, 12,100 lb. Maximum speed, 123 m.p.h. at ground level (estimated).

De Havilland "Tiger Moth" ("Gipsy III").—A modern preliminary training type, which has already been described in FLIGHT. Gross weight, 1,650 lb. Max. speed, 107.5 m.p.h. at ground level.



VICKERS "JOCKEY" ("Jupiter VII F"). (R.A.F. Official Photograph, Crown Copyright.)



The R.Ae.S. Garden Party

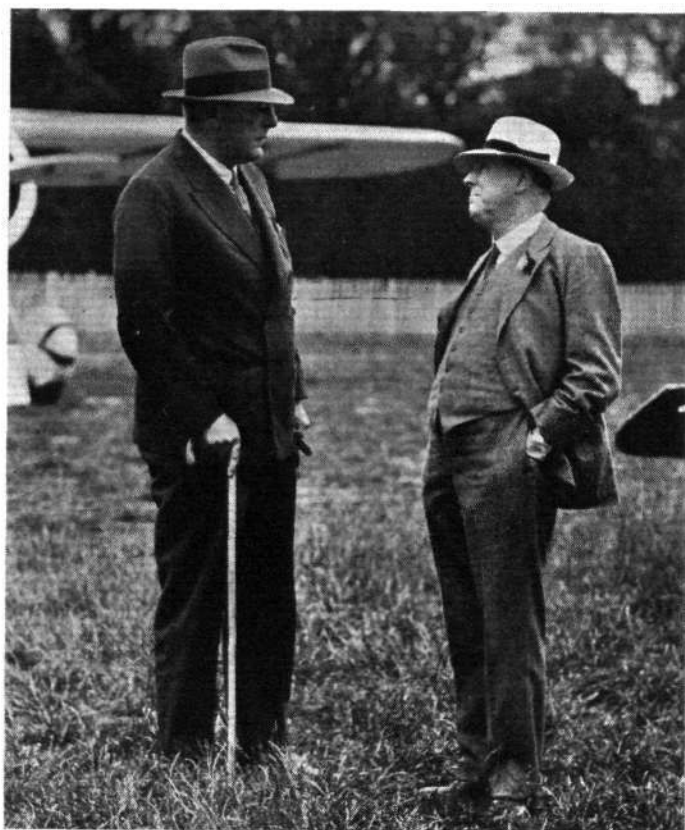
THAT it was a very happy idea of the President (Mr. C. R. Fairey) and Council of the Royal Aeronautical Society to hold a Garden Party was shown by the exceptionally large attendance at the London Air Park at Hanworth on Sunday last. Altogether more than 600 members of the R.Ae.S. and their friends took the opportunity to visit Hanworth, so that with members of the Hanworth Club a total of something like 1,000 people, not counting the considerable number of representatives of the general public, witnessed some very fine displays of flying, and many of them took the air for short flights. The arrangement was that an inclusive fee was charged, for which visitors obtained their afternoon tea and a joyride flight in one of the club's machines.

Many very distinguished members of the Royal Aeronautical Society were present at the garden party, and one noticed among them many who are infrequently seen at flying meetings, which must be very gratifying to the organisers. The large number of acceptances must have entailed a great deal of hard work on Mr. Pritchard and his staff, and it is worth placing on record the fact that we have not heard one single complaint of tickets not reaching their purchasers in good time.

The programme of the day called for joyride flights before and after a series of demonstration flights by a selected number of aircraft types, and during the early afternoon the Hanworth Club's Desoutter monoplanes were kept busy taking up passengers. *Heracles*, one of Imperial Airways' air liners, had been flown over from Croydon to take up members of the general public for joyrides. Towards the end of the day the *Heracles* came to grief through one of the wheels breaking through the covering over a ditch, and sustained considerable damage.

About 3 p.m. the signal "cease fire" was sent to all the joyriders, Imperial and otherwise, and the spectacular part of the programme began. It is significant that much of the applause which greeted the various demonstrations came from very eminent scientists and technicians, who apparently enjoyed seeing the aircraft performing their intended functions all the more because many of them had been concerned in the "highbrow" sciences on which the aircraft are based.

It was quite a happy thought to place first on the programme an exhibition of "crazy flying" by Mr. Brown, Avro's chief test pilot, on the Avro "Cadet." Everyone who has flown this type is impressed by its uncommonly fine controllability, and Mr. Brown took some serious liberties with the machine in demonstrating what a pilot should not do. His exhibition put everyone in excellent mood to enjoy the afternoon's proceedings.



TALKING IT OVER : Mr. C. R. Fairey, President of the R.Ae.S., and Mr. R. A. Bruce, Managing Director of Westlands, at the Hanworth Garden Party. (FLIGHT Photo.)

Mr. Christopher Clarkson, manager of Selfridge's Aviation Department, "rode two mounts." First he showed the excellent climb and general handiness of the little Comper "Swift" (Pobjoy), and afterwards he boarded his "Gipsy Moth" and flew round and round the aerodrome upside down.

The next item on the programme was to have been a flight by Flt. Lt. Schofield in the Monospar machine (two Pobjoys), but although the Air Ministry had agreed to permit the not-yet-but-soon-to-be-licensed machine to fly over from Croydon, it was not allowed to fly during the Garden Party. Such solicitude for the welfare of members of the R.Ae.S. is quite touching.

F/O. Leech came next, with a splendid demonstration of the little Arrow "Active" single-seater (Gipsy III), which gives the impression of performing like a single-



SOME OF THE PERFORMERS AT HANWORTH : A large variety of aircraft types was demonstrated, ranging from the Comper "Swift" (Pobjoy) to the Hawker "Hart" (Kestrel) and Fairey "Firefly III" (Kestrel). (FLIGHT Photo.)

seater fighter, and would make a fine training machine if fitted with a camera gun.

An "Autogiro" carrying the somewhat inelegant but presumably necessary registration letters G-ABUG, and piloted by Mr. Brie, next gave a demonstration of slow flying, vertical descent and similar feats in which this type excels. We noticed that Lord Weir of Eastwood was highly amused at the antics of the machine, with the development of which his brother, Air Commodore J. G. Weir, has had so much to do.

While the "Autogiro" was being demonstrated, the Rolls-Royce "Kestrel" of the Hawker "Hart" was being warmed up, preparatory to being flown by Mr. P. E. G. Sayer. Mr. Sayer gave a fine show on this machine, his climbs with the fuselage absolutely vertical being particularly impressive. The machine seems to be able to continue this vertical climb for hundreds of feet.

Mr. C. F. Uwins had flown over from Bristol a "Bulldog" fitted with a French supercharged "Jupiter" engine, and specialised in slow rolls, in which the smooth controls of the "Bulldog" were well illustrated.

Mr. Penrose, who had brought over from Yeovil Mr. Bruce and members of his family, showed what a really fine little three-engined civil machine the "Wessex" is. His slow-flying demonstration indicated that controllability extends right down to stalling speed.

For sheer impressiveness there was nothing during the day to beat Flt. Lt. Staniland's exhibition on the Fairey "Firefly III" (Rolls Royce "Kestrel"). His zooms ending in vertical upward rolls were simply amazing, while a tight circle of the aerodrome, in a vertical bank, was of such small diameter that one wondered if Staniland got into his own slipstream!

By way of showing an American commercial machine, Mr. Cathcart Jones flew the Lockheed "Vega." The machine is certainly fast, and when flying light at any rate seems capable of flying quite slowly as well.



WATCHING THE HANWORTH DEMONSTRATIONS:
Sir John D. Siddeley and Air Marshal Sir Robert Brooke-Popham, Commandant of Imperial Defence College.
(FLIGHT Photo.)



PILOTING IN COMFORT

It is difficult to imagine any type of aircraft which would give the pilot a better outlook forward than the latest "Monospar." So open is this that our photograph provides what might almost be termed a flying portrait of Flt. Lt. H. M. Schofield when he was over Croydon recently. This machine with its two Pobjoy engines gives its occupants a security, performance and comfort not hitherto available in an aircraft of this size. During a short flight we ourselves found the "Monospar" admir-

able to handle either with both engines running or with one throttled right back. The position of the controls and the general layout from the pilot's point of view is all that could be desired, and the provision of transparent windows behind the pilot and above the passengers eradicates that bugbear of so many cabin aircraft, namely, the inability to see behind when taking off. General Aircraft, Ltd., have in this machine produced one of the most pleasing cabin aircraft it has been our luck to try. (FLIGHT Photo.)

Private Flying & Gliding

A PLEASANT FLYING MEETING

THE Reading Aero Club led the way on Saturday, June 18, by holding a meeting with flying as a secondary consideration. They set out to get together all their friends, and those whom they hoped would become their friends, for a cheerful garden-party sort of afternoon, during which they entertained them with a few flying displays. The whole idea worked out very well indeed, and, aided and abetted by the weather, the management of the club certainly achieved their object.

The club house is admirably arranged for a garden-party; the new glass-covered varandah which has been built in front of it forming an excellent vantage point, from which one may watch the proceedings while at the same time reclining at ease. In the foreground the flower beds lighten what is so often a dull vista of tarmac in the more conventional flying club house. The idea of doing without tarmac in front is really a good one, and has proved completely practicable. The gravel paths which lead away from the club house ensure that the members do not wear down the ground in front into a morass of mud even in the wettest weather, with the result that it is very much easier to keep the club clean.

The flying part of the programme opened at 3.30 p.m. with a display of aerobatics by Capt. H. S. Broad. He was, naturally, flying a "Tiger Moth" (Gipsy III), and he went through his usual very complete repertoire, including a new combination wherein he performs the first half of a loop, then half rolls back into the normal position, and immediately does a bunt, out of which he half rolls at the bottom. Carried out smoothly, as Capt. Broad does it, this is a very pretty manoeuvre to watch.

Following a short interval there was the ladies' race for a cup presented by the President of the club, the Earl of Northesk. This was around a course of about 30 miles, and was won by Miss Sale-Barker in a "Moth" (Gipsy I), followed by Miss Muntz, Comper "Swift" (Pobjoy); Mrs. Battye, "Moth" (Cirrus III); Miss Giles, "Moth" (Gipsy I); and Countess Louise de Looz Corswarem, "St. Hubert" (Walter), who had flown over from Brussels for

the occasion. Our old friends Mr. Rowarth and Capt. Dancy were responsible for the handicapping, although they were not present to see the result of their handiwork—hardly surprising with the King's Cup race in less than 3 weeks' time! They had evidently been a little hard on the Countess, although due allowance must be made for the fact that she, according to reports, got somewhat off her course at one point. Apart from that, however, very few seconds served to cover all the first four finishers.

A display of daylight fireworks by Brocks, Ltd., provided the "lighter side" to the meeting, the variety of queer fish, horses and figures which were sent out of rockets greatly amusing the onlookers.

While this was going on, Col. F. C. Shelmerdine, the Director of Civil Aviation, inspected and adjudged the visiting aircraft as to which was in the best kept condition having regard to its age. Mr. W. C. Harley was chosen as an easy winner in this competition with his "Moth" (Cirrus II), G-EBQV, and after "viewing" this aircraft we must agree that we have seldom seen a better kept machine. Mr. Harley is member of both the Reading Aero Club and of Hanworth Park, at which latter place he keeps his machine.

Two other items rounded off the programme for the visitors, who by this time were feeling at peace with the world, having partaken of a most excellent tea. The first was a demonstration of mailbag dropping with a small Russell Lobe parachute designed for the purpose, the second was a display by Mr. Symondson, who had flown his "Moth" up from his own aerodrome at Colyton in Devon.

Earlier in the afternoon Capt. Broad had received a memento of the occasion from the hands of the Duchess of Bedford, and at the conclusion Col. Shelmerdine presented not only the cup to Miss Sale-Barker but also table cigarette-lighters, thoughtfully provided by the club, to those pilots who had taken part in the display, also to Mr. J. Jeffs, who acted as Control Officer, and Mr. E. C. Brown, who had undertaken the duties of announcer in his usual able manner throughout the afternoon.



FLYING CLUB COMFORT: The Reading Aero Club certainly made their guests comfortable on Saturday, and by keeping the amount of flying to a minimum they ensured that everyone could have their tea in comfort, without feeling that they ought to be outside the marquee gazing at the sky. The absence of tarmac makes this club a very attractive one, and allows a gathering like this to sit at ease round the flower beds.

THE TOUR OF FRANCE



THE TOUR OF FRANCE : Some of the machines outside the hangar at Orly before the start on June 4.

THE Second Annual Tour of France, held under the direction of the Union des Pilotes Civils and the patronage of the *Journal*, started from the Orly airport on Saturday morning, June 4 last. Some 63 planes had been originally entered, of which 55 "took off" for the Tour. All the planes and motors entered were of French design and manufacture, and all the pilots of French nationality.

The course, as laid out, covered a flight well around France by easy stages, over a period of nine days, of some 2,100 miles.

About all the types of French tourist planes were represented. There were 10 Farman, mostly of the low-wing monoplane 230 type, 19 Caudrons, 11 of which were the new "Luciole" type biplanes, and 24 Potez 36's, cabin monoplanes. There was also an ancient Farman pusher "cage à poule" (hen-coop), equipped with an 80-h.p. Renault, which was the first machine away. This machine was constructed in 1912 and was piloted by Louis Gaubert, himself an old-timer, having obtained his licence in 1909. It won a Rally to Deauville in 1913. A Schreck Amphibian and a small Mauboussin cabin monoplane, equipped with a 40-h.p. Salmson engine, of the type that René Lefèvre used in his recent Madagascar flight, were also among the machines that took off.

The pilots, machines and engines in the Tour were as follow:—

Louis Gaubert, Farman 40 (80-h.p. Renault); Louis Aurelle, Schreck Amphibian (Lorraine); Nicolle, Mauboussin (40-h.p. Salmson); Marcel Palayret, Caudron 193 (95-h.p. Renault); Roger Nouvel, Farman 231 (95-h.p. Renault); Jose Lardy, Farman 234 (95-h.p. Renault); Jacques Puget, Farman 234 (95-h.p. Salmson); Jacques Bretenecourt, Farman 234 (95-h.p. Salmson); Vaillant, Farman 202 (120-h.p. Salmson); André Chalaux, Farman 200 (95-h.p. Salmson); Marcel Coadou, Farman 232 (100-h.p. Michel); Joseph Gastou, Farman 204 (110-h.p. Lorraine); Marcel Langlois, Farman 201 (100-h.p. Hispano-Suiza); Fremont, Caudron 270 (95-h.p. Salmson); Raymond Delarbe, Caudron 270 (95-h.p. Salmson); André Clement, Caudron 270 (95-h.p. Salmson); Gallot, Caudron 270 (95-h.p. Salmson); Paul Legastillois, Caudron 270 (95-h.p. Salmson); Marcel Barrier, Caudron 270 (95-h.p. Salmson); Dr. Glaise Rambal, Caudron 270 (95-h.p. Salmson); Robert Langoise, Caudron 270 (95-h.p. Salmson); Jean Brassart, Caudron 270 (95-h.p. Salmson); Charles Strubbe, Caudron 270 (95-h.p. Salmson); Antoine Chaize, Caudron 230 (95-h.p. Salmson); André Dumont, Caudron 230 (95-h.p. Salmson); Henri Gelley, Caudron 230 (95-h.p. Salmson); Emile Bideau, Caudron 272 (95-h.p. Renault); Ernest Dufer, Caudron 232 (100-h.p. Michel); Hubert Lambotte, Caudron 232 (95-h.p. Renault); Carnot-Dulac, Caudron 232 (95-h.p. Renault); Pierre Espiard, Caudron 232 (95-h.p. Renault); Marcel Legendre, Potez 36 (95-h.p. Renault); Camille Marot, Potez 36 (95-h.p. Renault); Robert Blauger, Potez 36 (95-h.p. Renault); Georges Fougeres, Potez 36 (95-h.p. Renault); Louis Lecorche,

Potez 36 (95-h.p. Renault); Raoul Lhuillery, Potez 36 (95-h.p. Renault); Marcel Dhôme, Potez 36 (95-h.p. Renault); Charles Debray, Potez 36 (95-h.p. Renault); Pegulu de Rovin, Potez 36 (95-h.p. Renault); Claude Menetrier, Potez 36 (95-h.p. Renault); Guy Liger-Belair, Potez 36 (95-h.p. Renault); Pierre Alban, Potez 36 (95-h.p. Salmson); Jean Claude, Potez 36 (95-h.p. Salmson); Emile Charpentier, Potez 36 (95-h.p. Salmson); Albert Semiriot, Potez 36 (95-h.p. Salmson); Alexandre Cousin, Potez 36 (95-h.p. Salmson); Jean Lietard, Potez 36 (95-h.p. Salmson); André Dupechez, Potez 36 (95-h.p. Salmson); Emile Vivier, Potez 36 (95-h.p. Salmson); Philippe Léon, Potez 36 (95-h.p. Salmson); Jean Blairon, Potez 36 (95-h.p. Salmson); Geo. Delage, Potez 36 (95-h.p. Salmson); Michel D ré, Potez 36 (Potez); Raoul Minjoz, Potez 36 (Potez).

Of the 55 starters 47 completed the Tour at the Blériot Aerodrome at Buc, four others also finishing but not qualifying owing to mechanical and other troubles *en route*. Out of the 47 to finish, 14 completed the Tour without penalties, the remainder being classified according to the penalties received during the Tour.

An unfortunate accident somewhat marred the Tour when, on June 6, a Potez machine piloted by M. Paraut and carrying two judges of the Tour, Jean Cailloux and André Boulat, and a journalist, crashed when landing at Avignon, all four occupants being killed.

R. C. W.

SHANKLIN

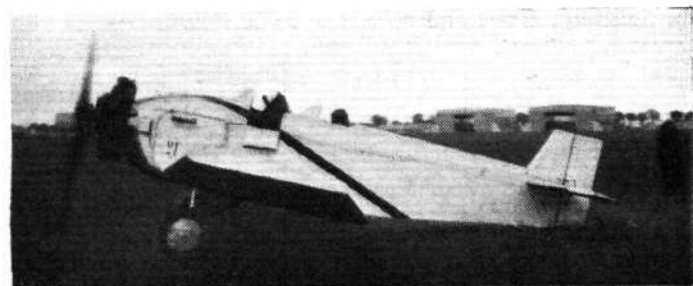
The Pageant arranged by the Portsmouth, Southsea & Isle of Wight Aviation Co. for July 16 has unavoidably been cancelled.

LEICESTERSHIRE AERO CLUB

The week ending June 18 and 19 was a busy one for the Leicestershire Aero Club, for on both Friday and Saturday nights, night flying displays were held at the private aerodrome of Mr. Lindsay Everard at Ratcliffe. During Saturday afternoon the police requested the collaboration of the club in searching for burglars who had escaped into the fields from a neighbouring town. Although the men were not sighted, one was caused to break out of his hiding place, and was promptly captured. On Sunday morning the four club machines made an early morning tour to Croydon, where the passengers partook of breakfast before they returned to Desford. During the day 28 of the 63 entries for the flying scholarship presented by the *Leicestershire Evening Mail* were given their tests. The two best of the entries will be trained for their "A" licence free of charge. During the day the club machines put in 24 hr. 35 min.



OLD AND NEW IN THE TOUR OF FRANCE :



The first away was the old Farman 40 pusher (80-h.p. Renault), built in 1912, shown on the left. Of more recent origin was the Farman 234 (95-h.p. Salmson) shown on the right.

SKEGNESS

Preparations for the second pageant on July 31 are now well in hand, and the programme will include long and short distance races and also an altitude race. There will be a game of football by two teams of motor cyclists, and the pageant will be preceded by a supper-dance on the Saturday evening in a marquee erected on the aerodrome. Three members of the Skegness Aero Club have now passed their "A" licence tests, and several more are nearly ready to do so. The Nottingham-Skegness taxi service is being well patronised, while the amount of work done in joy-riding is increasing rapidly.



LUXURY FOR THE PRIVATE OWNER: Major J. E. D. Shaw, who flies at Heston, has recently acquired this Avro "Cadet" (7 cyl. Genet). It has very complete dual controls. (Flight Photo.)

ISLE OF MAN AIR MEETING

The Isle of Man Air Meeting was organised jointly by the June Effort and Season Extension Committee of Douglas and the Lancashire Aero Club.

The first event was the arrival competition at Blackpool for a prize presented by Mr. Stephen Wilkinson. In time-honoured fashion it was won by a competitor who had forgotten the competition, the pilot being Mr. J. R. Ashwell-Cooke, in a "Moth" (Cirrus III).

From Blackpool to the Isle of Man competitors were escorted by a Saro "Cutty Sark," provided by British Amphibious Air Lines, Ltd.

Saturday morning was spent in practising round the course. Visibility and weather conditions generally could hardly have been better, and competitors were unanimous in their praise of the course chosen, which involved roughly two complete circuits of the Island and a distance of about 110 miles. Not content with flying round the course, Mr. Ashwell-Cooke and his navigator, Mr. Campbell Black, went round the course by car in order to make quite certain of their land marks to steer by after each turning point. By so doing they stole a march on the other competitors, as later appeared.

The race commenced punctually at 2.30 p.m., all the competitors facing the starter except the "Cutty Sark," which unfortunately experienced minor engine trouble and was compelled to retire at the last moment.

Owing to the excellent ground organisation it was possible to keep the crowd fully informed of the progress of the race through the loud speakers, registration letters and times at each turning point being received within half-a-minute of the passing of each machine.

MQ quickly took the lead from EC and held it till half way round the second lap, when ZZ went up into the lead. EC, ED and BR were all losing on their handicap allowances, but VU, the Avro "Cadet," and ZC, the Comper "Swift," were both coming up rapidly. On the second lap of the course ED picked up about two miles an hour and began to catch up. Meanwhile VU and ZC were pulling up rapidly on DE and EE, both of which in turn were hotly pursuing MQ and ZZ. On the last leg of the course VU moved up to second position, only to be passed by ZC, which, however, was unable to catch ZZ. After crossing the corner of the mountains at a height of about 700 ft. all the aircraft were in sight from the aerodrome on the seven mile straight course to the finishing line, and great enthusiasm prevailed among the crowd. The order of finishing, times and speeds were as follows:—

Machine.	Pilot.	Finishing Time.	Speed.	Handicap allowance.
		h. m. s.	m.p.h.	m. secs.
"Moth" (Cirrus III) ZZ	J. R. Ashwell-Cooke	1 9 17	102.5	14 39
"Swift" (Pobjoy) ZC	G. Clapham	1 10 23	126	1 22
"Cadet" (7 cyl. Genet) VU	R. H. Dobson	1 10 31	120.75	3 33
"Moth" (Cirrus II) MQ	K. Twemlow	1 10 45	96.25	17 37
"Widgeon" (Gipsy I) DE	C. S. Napier	1 11 15	105	11 15
"Avian" (Hermes II) ED	Miss W. S. Brown	1 12 17	117½	3 18
"Avian" (Hermes II) EE	R. F. Hall	1 12 30	110½	6 44
"Monocoupe" (Warner) BR	Lord Malcolm Douglas Hamilton	1 13 55	121	Scratch.
"Avian" (Cirrus II) EC	S. Hawley	1 14 55	50½	18 01

The race was followed by various competitions. The first of these was the now familiar balloon-bursting competition, in which Flt. Lt. T. Rose on the Avro "Cadet" caught the bunch of balloons inside his Townsend ring and burst the whole lot within ten seconds of their release. He was an easy winner, with Mr. S. Hawley on an Avian (Cirrus II) second.

In the bomb-dropping contest a moving target consisting of a lorry was bombed from a height of not less than 100 ft. Mr. K. Twemlow and Mr. R. F. Hall were by far the most accurate, but both were unfortunately disqualified for coming below 100 ft. on one of their three attacks. The winner was Flt. Lt. Comper on the "Comper Swift," and the second was again Mr. Hawley.

In the taxiing competitions, competitors had to steer a zig-zag course between bamboo poles and across the finishing line, the result being taken on fastest time over the course. Those with wheel brakes were not allowed the service of a wing tip assistant. The Avro "Cadet" with Mr. Dobson as pilot proved the efficiency of its wheel brakes beyond question and won with 40 sec., but Mr. R. F. Hall on a Avian, nobly assisted by Mr. Greg on the wing-tip, came in a very good second in 41.2/5 sec.

Between the competitions displays of aerobatics were given by Miss W. S. Brown and Mr. R. F. Hall, both flying Avians. The meeting wound up with a thrilling aerobatic display by Mr. G. Clapham on a "Swift."

The judges of the race were the Deemster of the Island, Deemster Farrant, and the Rev. B. H. Stenning, while the Chief Marshal on behalf of the June Effort and Season Extension Committee was Mr. W. Cunningham, the only private owner on the Island, who performed his duties with outstanding ability.

The prizes were presented in the evening at the Palace, Douglas, in the presence of a large crowd. In addition to the prizes for the race and the various competitions, every competitor was presented by the authorities with a souvenir of the first Isle of Man Air Race in the form of a silver ash tray suitably engraved.

All competitors returned safely to the Mainland by air on Sunday morning, where they were the guests of the Blackpool Corporation for lunch at Stanley Park Aerodrome, and the arrival competition prize was presented by Mr. Wilkinson.

The main object of the meeting was to promote air-mindedness in the Isle of Man with a view to establishing a regular aerodrome there, and to judge by the enthusiasm which the meeting evoked it should have a very fair chance of succeeding in its object. The Organising Committee in Douglas, the Lancashire Aero Club, and last but not least the anonymous donor of the prizes for the race, are alike to be congratulated on the success of the meeting.

A. G.

AERO CLUB AT PLYMOUTH

The Plymouth Aero Club has now been formed into a private company, and the title has been altered to the Plymouth and District Aero Club. Mr. Roy Mumford, of "The Oaks," Hartley, Plymouth, has been appointed as Secretary of both the company and the club, while His Worship the Mayor of Plymouth has accepted the Presidency of the latter.



CIRRUS IN U.S.A.: The Great Lakes Sports Trainer fitted with the American Cirrus engine is a popular type with American private owners.

flying, while other machines which were demonstrated were the Avro "Cadet," the Armstrong Whitworth A.W.XVI and the Comper "Swift."

AT BRISTOL

Two free flying scholarships are offered by the Bristol and Wessex Aeroplane Club to men residing within a radius of 30 miles from Bristol airport. Candidates must be over 18 years of age and must undergo a flying test at the club, which will consist of a minimum of 20 min. dual. Only 30 candidates will be accepted for test in the first place, and of these the six most promising will be given a further 30 min. test. From these six the two most successful will receive the complete course for their "A" licences free of charge. During May the flying time for the club was 156 hr. 35 min. This is an increase of 14 hr. over the same period last year, despite the fact that the weather was exceedingly wet. The blind flying course for qualified pilots is receiving considerable support, but there is still room for any others who wisely decide to learn to fly by instruments. The amount of work being undertaken by Airwork, Ltd., in their service hangar is assuming large proportions, and during a recent visit eight machines were having work done upon them. The air taxi service maintained by Phillips & Powis at Reading is also receiving a large amount of work, and recent journeys have been made to places as widely apart as London and Abergavenny. The Bristol-Cardiff service will start on July 11 with four trips daily in each direction. The journey will take 40 min. from the Grand Hotel, Bristol, to the Park Hotel, Cardiff. As this will provide a very large saving of time to business men, it is confidently expected that the patronage it will receive will be considerable.

AVIATION AT DONCASTER

The new aerodrome at Armthorpe, near Doncaster, was opened on Thursday, June 16, by a visit of Sir Alan Cobham's National Aviation Day Display. Hangar accommodation will be available shortly, and petrol and oil supplies are obtainable by visitors now. Councillor Hepworth declared the aerodrome open. It is hoped that visitors will use this aerodrome until such time as the Doncaster Municipal Airport is ready.

NOTTINGHAM

Over 5,000 spectators attended the display arranged by the Nottingham Flying Club at Tollerton on June 18. The arrival competition was won by Mr. Bowling, who landed dead on time in his "Civilian Coupé." Over 23 visiting aircraft arrived, and these took part in the parade and fly-past, which also included a circuit of Nottingham. The cross-country race for visiting pilots was won by Mr. R. C. Winn in a "Puss Moth" (Gipsy III); Mr. M. Scott was second in a "Moth" (Gipsy I), and Mr. H. Ashworth third in a "Moth" (Gipsy II). There were also displays of aerobatics by club-trained pilots; a parachute descent by Mr. E. Fairlie and a demonstration of the Lockheed "Vega" flown by Mr. O. Cathcart Jones. This machine is that which made a record flight to the Cape when owned by the late Lt.-Com. Glen Kidston. No. 504 County of Nottingham (Bomber) Squadron gave a very fine show indeed of formation

ANGLO-GERMAN FRIENDSHIP

The cordial reception which was accorded to German pilots in this country last year prompted them to return that hospitality by arranging for several British pilots to attend the opening of the new aerodrome at Vechta, near Bremen, on June 4. The machines which went over were a "Klemm" (Mr. Crammond), "Westland Widgeon" (Mr. Ince), a "Puss Moth" (Mr. Scholes, Aviation representative of the National Benzole Co.), and an "Avian" (Mr. Stace, of Henlys Aviation Dept.). A hearty welcome was extended to the party on their arrival, and for the following two days and nights they were entertained with almost overwhelming hospitality. On Monday the visitors were shown round Bremen by members of the Aero Club, during which time they were once more entertained in a lavish manner. An evening at the "Astoria" concluded the proceedings, which were most enjoyable.

BROOKLANDS

Mr. J. W. Massey, who has worked for many years as Chief Engineer for Capt. Duncan Davis, has now been made a Director of Brooklands Aviation, Ltd. He is well known to all those private owners who have entrusted their machines to the Service Dept. at Brooklands, and his many friends will join with us in congratulating him upon his appointment. The flying time for the week was over 70 hr., while two members obtained their "A" licences. The Aero Club of the College of Aeronautical Engineering have produced, in Mr. R. A. Hall, their first "A" licence pupil, who passed his test on Sunday last. On Sunday, June 26, a Concours d'Elegance will be held on the aerodrome. A cup has been presented by the *Tatler* for the best cabin machine and by Gale & Polden, Ltd., for the best open machine. There will be no particular flying programme during the afternoon, but merely an "At Home," with music. Visitors are reminded that the school will be closed on June 25, so that everyone will be free to attend the R.A.F. Display at Hendon.



THE I.O.M. WINNERS: Mr. J. R. Ashwell-Cooke (right) with his "Moth" (Cirrus III), in which he won the "Round the Isle of Man" Race. On the left is Mr. Campbell Black, recently back from Kenya, who acted as navigator.

Airport News

NIGHT FLYING AT HESTON

AIRWORK, LTD., in conjunction with Chance Bros., Ltd., staged a demonstration of a new method of landing by night at Heston Airport on Friday, June 10. The system used is quite new in this country, although it is fairly well known in the U.S.A., and it has been evolved by Chance Bros. in collaboration with Mr. Nigel Norman, who has recently returned to this country after an extensive tour of the various American airports.

In effect the scheme provides a movable shadow in the beam of a fixed floodlight which can be kept on the pilot as he is landing, thereby obviating any dazzle or glare and making it possible for him, if need be, to land directly into the light. One of the first advantages which accrues from this system is the fact that it enables one fixed floodlight to be used regardless of the direction of the wind, and thereby eliminates the complication and trouble entailed by using a mobile floodlight which has to be towed round the aerodrome as the wind changes.

The lamp at Heston is mounted some 15-20 ft. above the ground in front of the control tower, and this elevation above the aerodrome ensures that small inequalities of the surface will not cause awkward shadows. The lamp itself is one of Chance Bros.' Third Order floodlights of approximately 800,000 candle-power, with an optical system consisting of a dioptric lens of 17 refracting elements having a diameter of 1,000 mm. and covering 180 deg. in azimuth. The lens is fitted into the usual ventilated mild steel body closely following lighthouse practice, as has many times been described in FLIGHT. The 10-kw. lamp has a double flat grid filament, and its mounting enables replacement to be made quickly, while the two filaments being arranged in parallel permit of one continuing to function should the other fail, thus obviating sudden extinction of the light, and danger should an aircraft be landing at the time.



WITH A SHADOW-BAR : The Chance floodlight mounted in front of the control tower at Heston. The bar is seen swung to the right of the photograph.
(FLIGHT Photo.)

Above the roof ventilator of the floodlight is mounted a tripod which carries a bearing supporting a vertical shaft. This shaft extends upwards to the upper platform of the control tower, where it is fitted with a hand control. Attached to this shaft is a light frame carrying a vertical



ARTIFICIAL DAYLIGHT : A magnificent photograph showing the perfection to which British engineers have brought the science of lighting aerodromes. It will be seen that the area illuminated extends to the boundary fence.
(FLIGHT Photo.)



NIGHT LIFE : (Left to right) Lt. Com. Geoffrey Rodd, R.N., who brought over Rear-Admiral A. L. Snagge (Chairman of the Royal Naval Flying Club) ; Miss Winifred Spooner, pilot to Mr. Lindsay Everard, whom she flew down from Ratcliffe, talking to Mr. Nigel Norman on their arrival at Heston. (FLIGHT Photos.)

sheet-metal strip some 8 in. wide, so placed that it is free to swing round the outer circumference of the lamp, as the hand control is used, at a distance of 2,000 mm. from the centre of the floodlight. This shadow-bar casts a 6-deg. shadow which may readily be trained in any part of the area covered by the beam of the floodlight.

During the night of the demonstration several machines were flown, and we ourselves were privileged to experience a landing made with this light. We found that the shadow-bar eliminated entirely all glare and that it was quite possible either to fly across in the beam of the lamp or even directly at it, both above it and on the same level, without any inconvenience whatsoever. On this occasion the direction of the wind necessitated landing at right angles to the main beam. The utility of the shadow was therefore not emphasised to the same extent as it would have been had one had to land directly at the light. Even under these conditions, however, the shadow assisted the pilot greatly by removing any possibility of reflection occurring from his instrument board and wind screen, which is often bad in such a machine as the "Puss Moth," when the light comes from behind the aircraft.

The method will undoubtedly raise considerable controversy as to its value, and we imagine that the advocates of the mobile floodlight, over which they have to

land, will maintain that landing under such conditions is easier than by this newer method, but there can be little doubt that, when cost, ease of operation, and comfort during taxiing are taken into account, the shadow-bar method will score on almost all counts.

The progress which has been made in this country in private night flying was emphasised by the arrival of four visitors from different parts of the country. These included Mr. Lindsay Everard, whose pilot, Miss Spooner, had flown him down from his own aerodrome at Ratcliffe and who returned there after the display was over at about 12.45 a.m. ; Lt. Com. Geoffrey Rodd, who brought Rear-Admiral A. L. Snagge and a friend, also from some distance away ; and two other machines which were flown over from Hamble and Hanworth.

As readers of our Private Flying Section will know, several flying clubs are now having regular night-flying days, and both the Reading Aero Club and Hanworth Park have found a demand for instruction on these occasions. There is also a steady demand for joy rides during the dark hours, which is not surprising, for nothing is nicer than to fly when the air is still and cool, and if the passenger is lucky enough to be given a sight of, for example, London by night, it is certain that he will never forget the experience.

CROYDON

A GLORIOUS week of real summer weather has just passed ; effect, Croydon has been very busy. A great amount of bullion has passed through here from America to Europe. Special machines were run by both Imperial Airways and the K.L.M. Companies.

Two of the Monospar machines have been out this week, and a very nice job they are. There is great secrecy in the General Aircraft camp concerning the speed of these machines, which will shortly be put through their paces at Martlesham.

On Wednesday Capt. G. P. Olley left Croydon for Southampton at 10.45 a.m. with two passengers to catch the S.S. *Europa* which sailed at 11.30 a.m. It is understood they arrived in time to catch the boat.

Miss Amy Johnson and Mr. Mollison flew to Cannes by Air Union on Thursday, en route to Juan-les-Pins.

Miss Winifred Brown returned from Germany on her "Avian," on her way to the Isle of Man meeting, described on page 570.

The first of Imperial Airways' new Armstrong Whitworth "Atalanta" class is expected shortly. The first tests are apparently very satisfactory.

The Short "Valette," after extensive tests, has left for Martlesham Heath for official tests.

Messrs. Rollason, Muir & Rickard have now added a new "Spartan" to their fleet of aircraft.

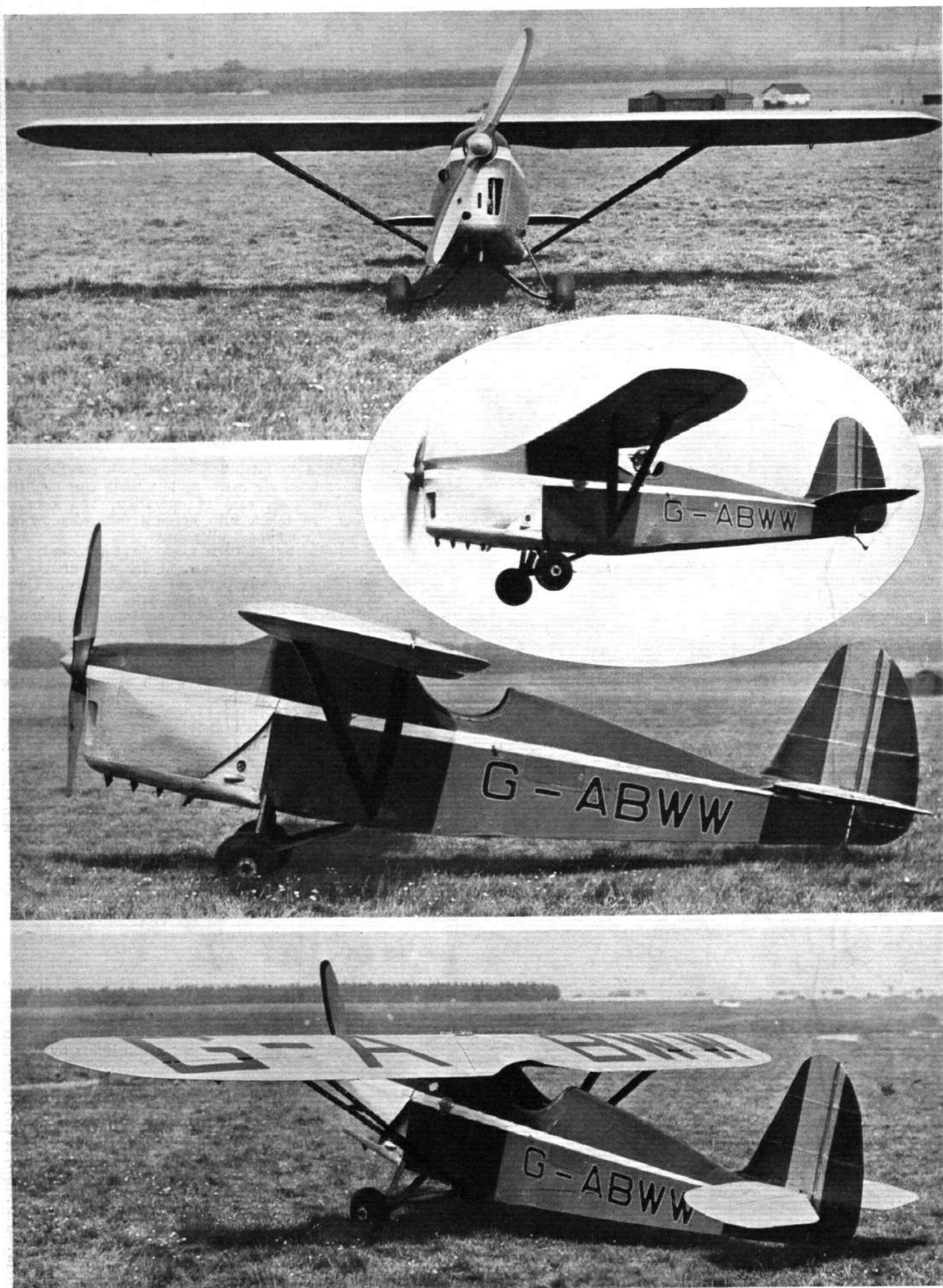
All pilots now consider the new boundary marking lights to be superior to the old type. The radio beacon mast is very well marked with ruby red obstruction lights by night and when bad visibility prevails. A trench is being dug in the vicinity of the landing circle for Neon landing tubes, and it is hoped that the smoke wind indicator will be in action shortly. A considerable amount of interest exists among the various air line pilots regarding the "shadow bar" method of landing by night. It would appear, however, that the majority of pilots prefer the Croydon floodlight and night landing arrangements.

On Sunday an accident occurred at Hanworth. Capt. W. Rogers, of Imperial Airways, Ltd., was taking off with *Heracles* after attending the Royal Aeronautical Society's Garden Party, one wheel sinking into a filled-in stream. Although the machine was damaged, none of the 32 passengers was hurt.

There are many "B" licence candidates awaiting night flights.

Traffic figures for the week :—Passengers, 1,965 ; freight, 55 tons.

P. B.



PRINCE OF WALES' KING'S CUP ENTRY : The Comper "Swift," with de Havilland "Gipsy III" engine, generally resembles the standard Pobjoy-engined "Swift" except for the nose of the fuselage. A brief description of this machine, and scale drawings, was published in our issue of June 3, 1932. (FLIGHT Photos)

Airisms from the Four Winds

King's Cup Handicaps

THE Royal Aero Club has now published the handicaps for the 50 machines taking part in the race for the King's Cup on July 8-9. A full list of the entries, handicap allowances, starting times, etc., will be published in due course. In the meantime an examination of the final list discloses certain interesting facts. First and foremost, one regrets to find that Prince George's entry, a "Puss Moth," has been withdrawn. There is, however, consolation in the fact that the Prince of Wales' entry, a Gipsy III "Swift" (see page 574) stands. At present it is found that there is no No. 35 in the list of handicaps. Presumably that number was to have been Prince George's machine. The Avro firm had the distinction of being the alpha and omega of the King's Cup Race, an "Avian III A" with "Genet II" engine being limit man, while the Avro Mailplane (Panther II A) is scratch. In between these two there is an interesting number of types. Two Blackburn B.2 Trainers are new, as is also the Prince of Wales' "Swift" Gipsy III, the two ST.4 Monospar machines, the Arrow "Active II," and the Percival "Gull." It is interesting to find that the handicappers have placed the ST.4 Monospar machine level with the Arrow "Active," while the Percival "Gull" receives some 9 minutes from the Gipsy "Swift" on the first day's flying. The Avro Mailplane gives the Gipsy "Swift" 1 hr. 10 min. on the first day, and 47 min. on the second day, or about 2 hr. on the total mileage of 1,223 miles.

Capt. Stack's Flight to India

CAPT. T. NEVILLE STACK—who, as reported in FLIGHT the other week, planned a quick journey to India in the Spartan Mailplane—left Heston at dawn on June 17. His machine, which has three Gipsy III engines, was named *Blackpool* at that town a few days previously, and Capt. Stack is carrying messages from Blackpool to the civic heads of each city at which he lands. Mr. W. Courtenay, in charge of organisation, and Mr. F. G. Taylor, an engineer, complete the crew on this venture. Athens was reached on the evening of June 18, but after leaving early next morning for Aleppo no further news came to hand until June 21, when it was reported that they had landed shortly after midday at Basra.

Italian Formation Atlantic Flight

THE second of the Atlantic flights by a formation of Italian seaplanes is to take place shortly. This time the squadron, consisting of 24 Savoia flying boats, will fly from Rome to New York, via Iceland. A Savoia flying boat, piloted by Com. Cagna with a crew of five, has already flown to Iceland to make surveys and preparations for the flight. This machine arrived at Derry, Ireland, on June 15, and proceeded to Reykjavik the following day.

The New Short Boat

It has now become permissible to refer briefly to the large flying-boat which Short Brothers have nearing completion at their Rochester works, to the order of the Air Ministry. Although following generally the lines of such famous types as the "Calcutta," "Rangoon," "Singapore" and "Kent" class, the new boat, which has not as yet been given a name, will be far and away



OFF TO GENEVA: Lord Londonderry, Secretary of State for Air, flew to Geneva last week to attend the conference there. He is here seen (centre) studying a strip map of his route with (right) Air Marshal Sir Geoffrey Salmond, Air Officer Commanding-in-Chief of Air Defence of Great Britain, and (left) Sqd. Ldr. John Whitford, C.O. of No. 24 (Communications) Squadron at Northolt.

larger than any of the previous types, what with a wing span of 120 ft. and a hull length of 89 ft. 6 in. The new boat is fitted with six Rolls-Royce "Buzzard" engines so that it will be the most powerful flying-boat ever built by a British firm. It will also be the heaviest, the gross weight being in the neighbourhood of 74,000 lb. The abandoning of the large Supermarine civil flying-boat for economic reasons was a regrettable necessity, but there is some consolation in the fact that much of the information and experience gained with this new military type will be applicable to commercial flying-boats at a later date.

Paris-Teheran Non-Stop

THE two French airmen, Girier and Rignot, left Le Bourget on June 19 in a Breguet Bidon (600 h.p. Hispano-Suiza) and flew non-stop to Teheran, Persia, in 29 hours.

Helium Gas in Trinidad

It is reported from Port-of-Spain, Trinidad, that a promising source of helium has been discovered in that island.



THE LATEST SPARTAN: This new Spartan is a six-seater with three Gipsy III engines. The wing is of ply-wood, while the roomy fuselage of "Alclad" closely follows the construction of the Saro "Cutty Sark." Flight tests have been made and the machine is very pleasant to handle.

The Napier E.97 Aero Engine

THE tendency in modern aircraft design is ever towards greater aerodynamic efficiency. Hitherto this tendency has been particularly noticeable in high-performance military aircraft, but in commercial types also the demand for low drag is becoming more and more insistent, and the smaller types of aeroplanes, designed more particularly for the private owner, are gradually coming to share in the modern search for efficiency.

The in-line, or "straight," cylinder arrangement does give a small frontal area, and consequently a low air resistance. The time was when it was feared that the effective cooling of all the cylinders might present serious problems, but practice extending over several years, and covering hundreds of thousands of flying hours, has shown that the cooling problem is by no means insuperable. It is true that so far our experience has been mostly with "straight-four" engines, but "straight-sixes" have been built, and

A STRAIGHT-SIX AIR-COOLED INVERTED ENGINE

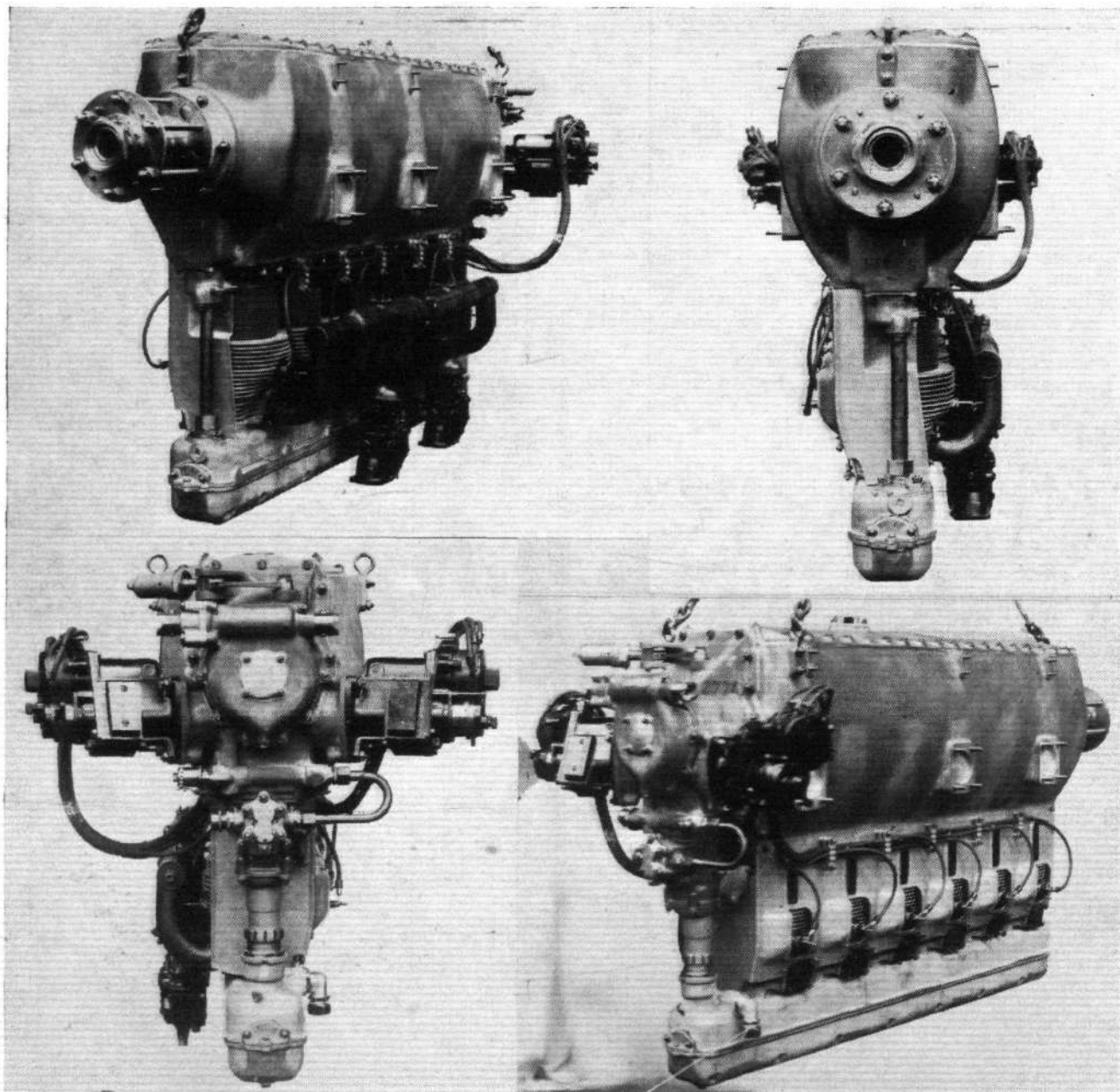
Bore, $4\frac{1}{2}$ in. (114 mm.).
Stroke, $5\frac{1}{4}$ in. (133 mm.).
Compression Ratio, 5.3 to 1.
Normal Speed, 2,000 r.p.m.
Normal Power, 150 b.h.p.
Maximum Speed, 2,300 r.p.m.
Maximum Power, 170 b.h.p.
Weight, 410 lb. (186 kg.).
Specific Weight (Normal) 2.73 lb./hp.

although perhaps slightly more difficult to cool, the difficulties are not great enough to be really serious.

Yet another tendency in modern aeroplane design is towards better view for the pilot. As more and more aircraft come into general use, the need for a good view in all directions which matter will become more and more vital. The inverted in-line engine is particularly helpful in this respect, since the airscrew height above the ground can be attained without a tall projecting area right in front of the pilot's eyes. The flat top of the crankcase of the inverted in-line engine offers no obstruction to the view, and as the hanging cylinders are narrow in the region of the

cylinder head, the pilot can, by leaning out slightly, see diagonally forward and downward past the engine.

Considerations such as those outlined above influenced the directors of D. Napier & Sons, Ltd., in deciding that the first Napier low-power aero engine should be of the inverted in-line type. And the E.97 engine illustrated



THE NEW NAPIER E.97 AERO ENGINE : These four views give a good idea of the very clean exterior of the engine. All auxiliary drives are concentrated on the rear end of the engine. Three hooks are provided for slinging, two at the rear corners of the crankcase and one on the front end. (FLIGHT Photos)

here is the Napier engineers' interpretation of what such an engine should be.

While the demand for cleaner design, and the meeting of that demand, results in increased performance, there is also a growing desire for more power. This is not necessarily wanted for greater performance, but may be utilised for carrying a slightly greater load. For example, 120 h.p. or so has been found to suffice for a machine carrying three people. If a four-seater is to have sufficient power reserve, some 150 h.p. is needed, unless, of course, the aircraft in question is of quite exceptional aerodynamic efficiency. The Napier firm decided that on all these scores, and also because of the extra smoothness of running which the straight six-cylinder arrangement gives, their new type should have six cylinders.

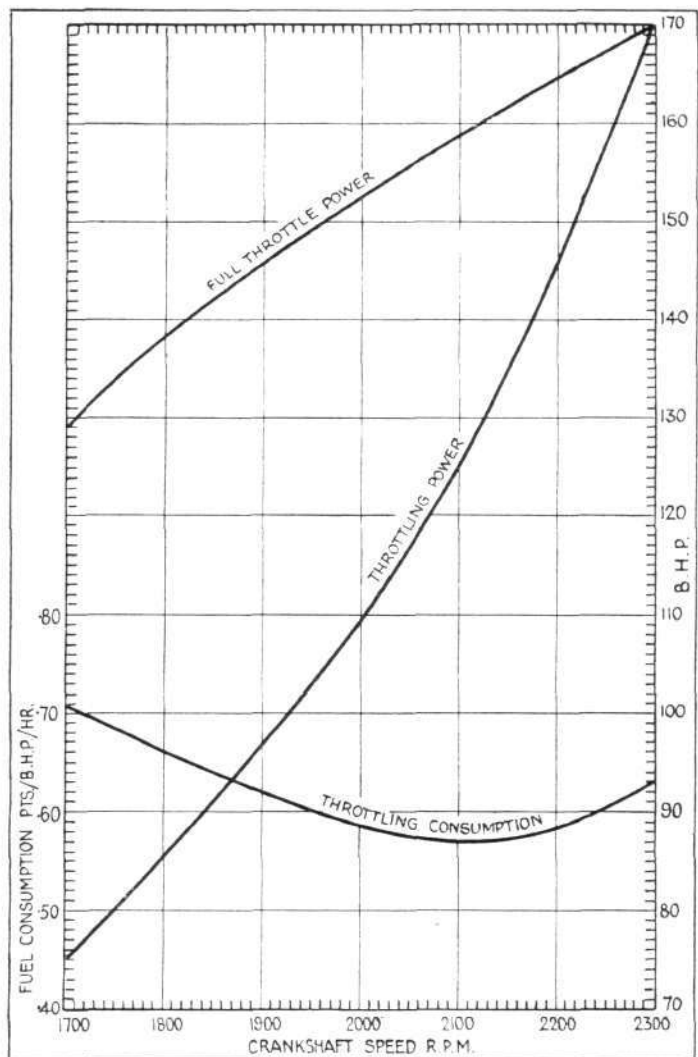
The new Napier E.97 engine is, then, a straight-six air-cooled inverted engine, the weight of which is 410 lb. and the normal power 150 b.h.p., which gives a specific weight, at normal power, of 2.73 lb./h.p. At full power the specific weight becomes 2.41 lb./h.p. Ultra lightness has not been sought in the design of the engine, but rather a very robust unit capable of running for very prolonged periods without needing overhauling. The first experimental engine was, as recorded in *FLIGHT* several weeks ago, installed in a "Spartan" aeroplane, and in that machine this engine has now done 150 hours without giving any serious trouble and without needing more than the usual occasional attention. A photograph of the "Spartan" light plane powered with the Napier E.97 engine was published in our issue of April 29, 1932, and showed how neatly the new engine can be built into an aircraft.

The crankcase of the E.97 engine is a light metal alloy "box" with rounded sides and top, and shows internally six large webs, which carry the plain bearings for the six-throw crankshaft, the seventh bearing being situated in the end of the crankcase. At the forward end of the crankcase is a combined journal and thrust ball bearing which takes the thrust of the airscrew.

The cylinders, which have steel barrels screwed into the aluminium alloy heads, are bolted to the bottom of the crankcase by eight studs each, and have two "overhead" valves in each cylinder, operated by an "overhead" camshaft which is housed in a completely enclosed casing. The camshaft is driven by vertical shaft at the rear end of the engine. The absence of push rods at the sides of the engine results in a very neat external appearance, and, as our photographs will show, the only excrescences on the engine are the Claudel-Hobson carburettors on the left-hand side. As these are placed low, it is a very easy matter for the aircraft designer, in most types at any rate, to provide for direct gravity feed from the petrol tank.

The pistons, which are of the full skirted type, are of light aluminium alloy, and each is fitted with two compression rings and two scraper rings. Hollow gudgeon pins of large diameter are used.

All connecting rods are of H section, and machined from

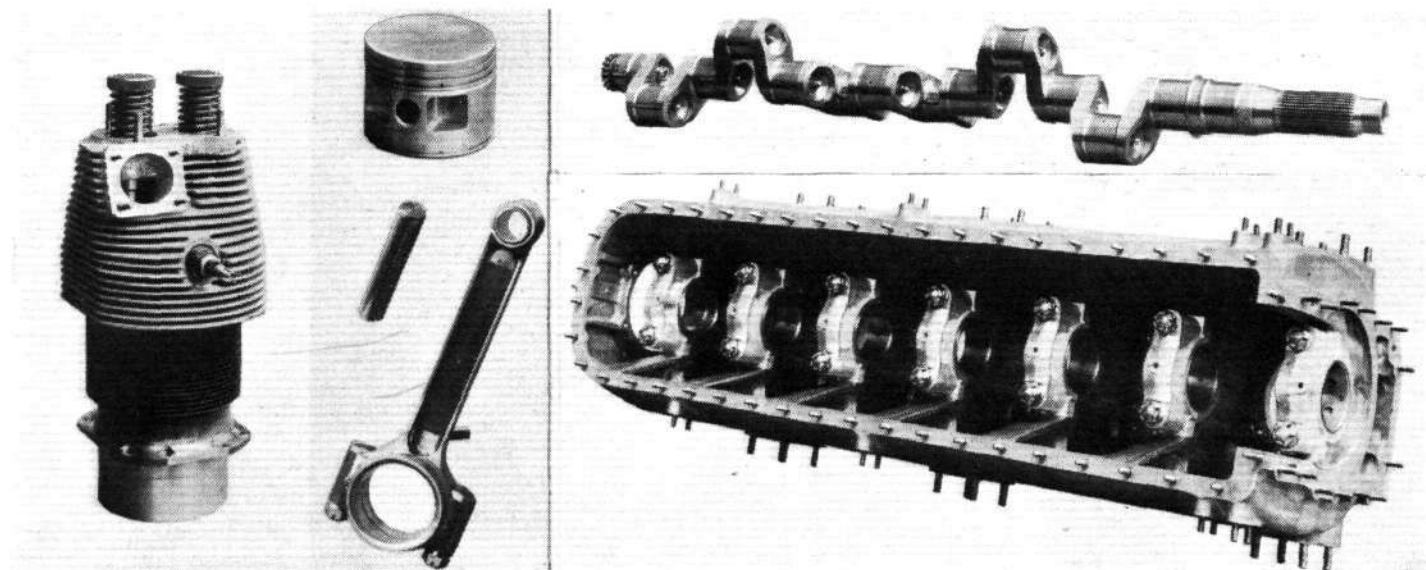


THE NAPIER E.97 ENGINE : Power and Consumption Curves.

solid steel forgings. The big ends are lined with white metal.

The crankshaft is machined from a solid steel forging, and is of standard six-throw type, as shown in one of our photographs. It runs in plain bearings, except for the thrust bearing at the forward end. This is of the deep-groove ball-bearing type.

Lubrication is by pressure pump to the main bearings and big ends, the pump being driven off the vertical drive shaft. At the forward end of the engine an oil tube joins



SOME DETAIL COMPONENTS OF THE E.97 : On the left a cylinder, piston, connecting rod and gudgeon pin ; on the right the crankcase and crankshaft. (*FLIGHT* Photos.)

the crankcase to the camshaft case, to ensure an adequate oil supply to the camshaft at all angles of tilt, while two scavenge pumps draw away the oil and return it to the tank.

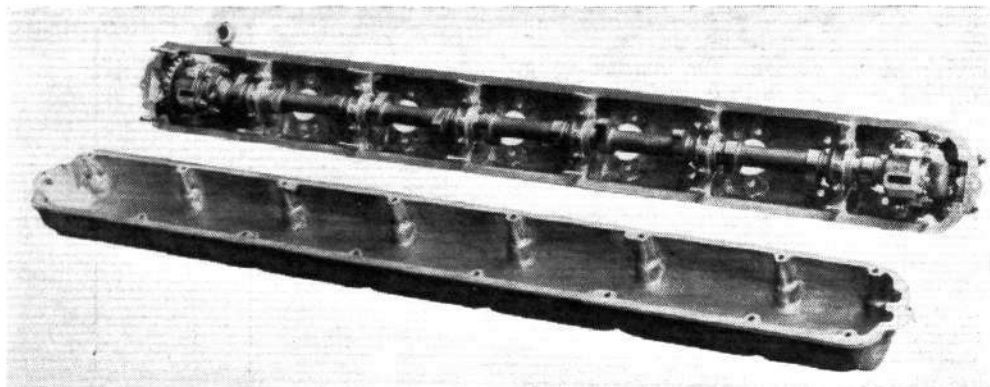
Ignition is by two high-tension magnetos firing two K.L.G. sparking plugs in each cylinder, the plugs being situated opposite to each other, one on the port and one on the starboard side.

Considerable experimentation has been carried out with a view to determining the most effective way of obtaining cooling of the cylinders, and deflector plates, etc., have been standardised, and are supplied with the engine.

The mounting of the Napier E.97 engine in the aircraft is by feet on the sides of the crankcase.

Provision is made for three feet on each side, but, if desired, the end ones only need be used, although carrying the engine on all six supports will naturally result in rather greater rigidity.

The main data relating to the Napier E.97 aero engine are given at the head of the first page of this article. What cannot be gathered from an inspection of the table and photographs is the splendid workmanship put into the



THE "OVERHEAD" CAMSHAFT: The camshaft is totally enclosed in a casing, removed from the engine as a unit when access to the valves is necessary. The camshaft is driven from a vertical shaft at the rear end of the engine. (FLIGHT Photo.)

engine. If we say that the workmanship is quite up to Napier's usual standard, it should be unnecessary to elaborate the point.

The E.97 engine has an overall length of 4 ft. 10½ in., a width of 2 ft. 2 in., and a height of 2 ft. 7½ in. For fuller particulars, installation diagrams, price, etc., readers are asked to apply to D. Napier & Sons, Ltd., Napier Motor Works, Acton, London, W.3.



Air Transport

Australia-England Air Service

SENATOR SIR GEORGE PEARCE, the Australian Minister of Defence, has proposed to the Cabinet that reports be obtained immediately from the Treasury, the Civil Aviation Department, the Post Office, and the railways on the practicability of an air service between Australia and England with connecting links within Australia.

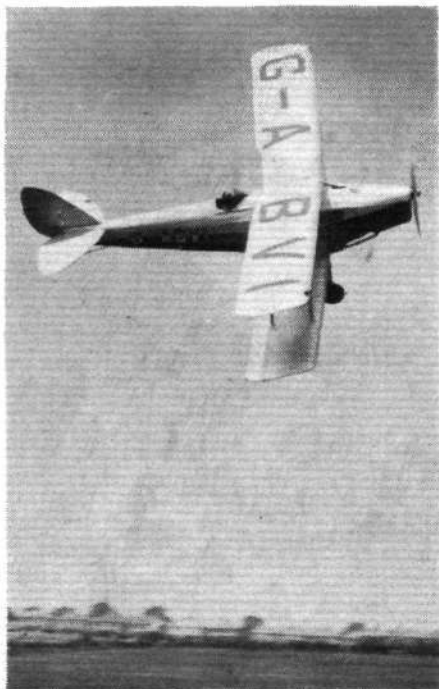
Mails by Airship

A BILL to permit airship companies to bid for United States mail contracts on ocean routes has been approved by the U.S. House of Representatives.

"Swissair's" Express Experience

THE express air service of the "Swissair," between Zürich and Vienna via Munich, has now been in operation for one month, and the results obtained are most encouraging. With the two Lockheed "Orion" machines

in use on the line, only one out of the 26 scheduled double journeys has had to be cancelled on account of bad weather, and the punctuality has been good except in one case, when there was a delay of half an hour. The average time for the journey has been 135 min. as against the scheduled time of 140 min. This represents a route speed of 157 m.p.h. Eighty-five passengers were carried on the Zürich-Vienna flights, and 79 passengers in the opposite direction. This represents 82 per cent. of the seating capacity. During the month the machines carried in addition to the passengers 2,000 lb. of mails, 250 lb. of freight and 950 lb. of luggage. These items account for 72.8 per cent. of the carrying capacity. As a result of the first month's experience the "Swissair" Company is reported to have under consideration the possibility of inaugurating express services on other routes.



THE FIRST PRODUCTION MODEL: The de Havilland "Fox Moth" (Gipsy III) has now gone into production, and the first of the batch, very effectively painted, was delivered to Hillman's Saloon Coaches & Airways on Saturday last. (FLIGHT Photo.)



The Industry

A NEW DUNLOP BRAKE

PROVISION of what the public want is the essence of good business, but very few firms ever seem to learn this basic fact. The Dunlop Rim & Wheel Co., Ltd., Foleshill, Coventry (Coventry 8633), however, who have consistently made this their policy, and therefore despite the demand for their mechanically-operated Bendix-type aircraft wheel brake, are now placing on the market a new pneumatic type, which will in turn be followed by a hydraulic type.

This new pneumatic type has many advantages, it is very light, it requires no adjustment, the blocks are withdrawn from the drum quite positively when the brake is released, worn blocks can be replaced quite easily, and the whole brake is contained inside the wheel where it is free from dirt and water and where it does not interfere with streamlining the wheel.

The brake is controlled by a lever mounted on the control column or in any other position which the pilot may prefer. The effect of this lever is to put on both brakes an equal amount, and in conjunction with this there is a valve mechanism interconnected with the rudder bar whereby the application of left rudder releases the right brake and vice versa.

The provision by the manufacturers of the whole of this control mechanism as a unit together with the brake greatly simplifies the work of the aircraft designer, and Dunlops are to be congratulated on the compactness of the whole outfit.

Reference to the illustration will show that the brake itself consists of an annular rubbered fabric expansion chamber (1), which is inflated by the introduction of compressed air. When inflated this chamber, or bag as it were, presses a series of brake block sections (2) out against the brake drum. These blocks cannot rotate owing to their having lugs (3), which pass

through slots in the U-section ring (4), wherein lies the expansion bag. A further use of these lugs is for the attachment of springs (5), which withdraw each block in a positive manner from the friction surface of the drum.

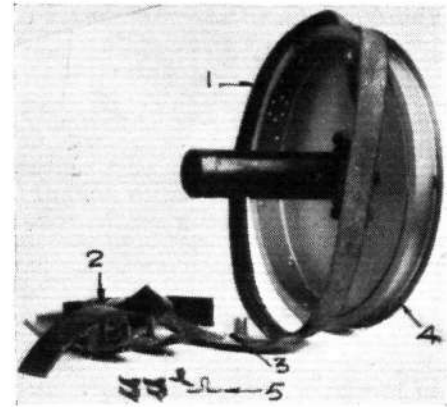
An advantage of this type of brake is that each unit is interchangeable, and may therefore be used on either wheel, while the design of the blocks allows them being correctly moulded to the brake drum, thus ensuring a very high braking efficiency.

The air for inflation is provided by a cylinder of a light-alloy construction, which has been developed by the company particularly for this purpose. The size of the cylinder will depend upon the means which are available for keeping it replenished, and if the aircraft is fitted with an engine-driven pump a comparatively small cylinder will suffice. The amount of air used for operation of the brakes is small, and on the firm's "Avian" over 100 landings have, with a cylinder about 2 ft. long, been made without replenishment. The cylinders are tested to 1,000 lb./sq. in., though 80 lb./sq. in. is ample to apply the brakes fully.

A neat form of triple pressure gauge has been evolved which indicates the pressure applied to each brake as well as that in the cylinder.

Air-tightness of the system is ensured by a special union, which has been designed for making connection between the various parts, such as the brake units and the relay valve system, by means of rubber hose. This union takes the form of a gland and nut with a lead ferrule, which when tightened up, clamps the rubber hose down over the nipples so that the pressure inside can be held indefinitely. This is important when the brake is used for parking the aircraft in a wind or on a slope.

The relay valve system which gives the differential effect to the brakes when operated by the rudder bar is ingenious, in that although permanently connected to the bar it has



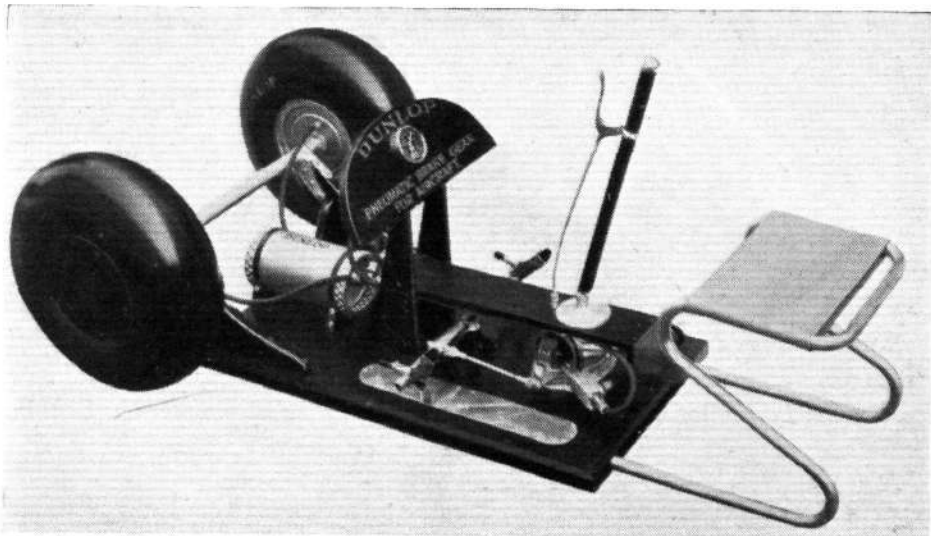
The wheel brake unit of the new Dunlop pneumatic brake. This may be used with high, low or intermediate pressure tyres. The figures refer to the description in the text.

no effect on the brakes unless the hand lever has first been moved to the "on" position. When this is the case then moving the rudder bar has the effect of releasing the pressure in the outside wheel brake. The inlet and exhaust valves used are almost the same as the standard "Schrader" valves used in motor car tyres, and are therefore entirely reliable, and moreover can readily be replaced.

Weights for this brake depend, of course, upon the size of unit, for example the brake unit itself for the 11½ in. model weighs 2 lb. 8 oz., while that for the 20 in. weighs 9 lb. 14 oz. The relay valve unit weighs 4 lb. with hand control, but exclusive of the rudder bar connection; the air container of 715 cu. in. capacity weighs 9 lb. 9 oz., and the rubber hose 0.071 lb. per foot, with another 0.053 lb. for each combination ferrule connection.

A demonstration of the "Avian" fitted with these brakes showed that they are very smooth in action, and that they provide ample braking effect for landing and handling the aircraft without assistance.

The wheels with which this "Avian" was fitted were also streamlined in a novel manner which bids to rival for efficiency the existing method of covering the wheels with cumbersome aluminium "spats" or fairings. The Dunlop method is to fill the space between the curved outer surface of the rubber tyre and the curved surface of the central disc portion of the wheel, with an angular segment of sponge rubber moulded so that the air will flow smoothly from the tyre straight over the sides of the wheel; this sponge rubber is retained by a light aluminium ring cover extending from the hub outwards and fitting on to it with a shoulder. At present the method is experimental, but wind-tunnel tests have been made, and these have proved that the standard Dunlop wheel and tyre, when fitted with this sponge rubber streamlining, has a lower drag than the same wheel with the most efficient form of "spat" over it. A further development will be the formation of a sponge rubber sleeve to fit over the junction of the axle, radius rod, and compression leg, where they come together on the wheel. Tests have also shown that this reduces the interference between these members to a greater degree than does the usual method.



The demonstration set of the Dunlop pneumatic, aircraft wheel-brake. The normal cylinder is larger than that used here. The operation of the valve mechanism requires no extra force on the rudder-bar.

MEYROWITZ GOGGLES FOR SAFETY

THE advisability of wearing non-splinterable goggles, such as those sold by E. B. Meyrowitz, 1a, Old Bond Street, London, W.1, is amply brought out by the recent accident to Capt. Frank Hawks, the well-known American high-speed record holder, who visited this country last year. Capt. Hawks' face was somewhat badly damaged in the crash which he had in his "Travel Air" machine when taking off, and in a letter we have received from Mrs. Hawks it is made evident that the safety glass of these goggles was undoubtedly responsible for saving his eyes. Although these goggles were quite severely damaged no pieces of glass became detached, and despite the accident Capt. Hawks was saved the terrible tragedy of losing his sight, a thing which has happened to many pilots who have used ordinary goggles.

ON LUBRICATION

"LINKS" is the title given to Alexander Duckham's new house journal, the first number of which has appeared this month. This title has been chosen, as it is hoped to make the journal a means of linking up the ever-growing number of users of Duckham products. Several pages are devoted to aviation matters, and are attractively illustrated with FLIGHT photographs. This issue also contains a great deal of information, which is of value to those who use lubricating oil, since it will enable them better to understand what lubricating oil does and how it does it. FLIGHT readers can obtain copies of this journal by writing to Alexander Duckham & Co., Ltd., 16, Cannon Street, London.

SANDS, CLAYS AND MINERALS

WE have found much pleasure in reading the first issue of a magazine devoted to economic minerals and called "Sands, Clays and Minerals." It is published by Algonon Lewin Curtis, of Chatteris, England, producers of sands, clays and refractory materials, and edited by Mr. N. E. Cutting. The presentation of the magazine, which will be

published quarterly at 5s. per annum, is in harmony with the subject matter, which throughout is strictly to the point yet quite interesting to the lay reader. A good art paper is used and the illustrations, which include coloured plates, are excellent. The magazine has come into being as a result of the interest expressed in the Company's catalogues, and in taking the step of meeting the demand for more information about sands, clays and minerals by producing this journal, the editor is to be congratulated on selecting contents of a general appeal, divorced from the guise of a catalogue. We look forward to the next number.

ON LINED BEARINGS

WE recently described the merits of the Hoyt Book on the Lined Bearing produced by the Hoyt Metal Co. of Great Britain, Ltd. The third edition is now ready, revised and enlarged, and packed with practical information for all who require and apply lined bearings. Copies of this magazine printed on toned art paper and neatly bound in a stiff cover can be obtained by our readers for 1s. 6d. post paid from the Company at Deodar Road, London, S.W.15.

ALUMINIUM

TWO publications from the British Aluminium Co., Ltd., of Adelaide House, London, E.C.4, are notably attractive in their style, one on powdered and granulated aluminium, having immediate advertising effect in its ornamental borders for which aluminium powder is used. In the world of lithography this powder has almost entirely superseded silver powder on account of its cheapness and non-tarnishing qualities. The utility of aluminium paint is described, with many fine illustrations in support. The brightening effect of aluminium paint as shown by one illustration of a factory interior shows that there is no justification for gloomy interiors. The second publication is a handy booklet of pocket size containing concise information and data on aluminium sheet metal work, also well illustrated.

MODERN PUBLICITY

THE departure from Blackpool of the Spartan "Mailplane" (3 Gipsy III's), which Capt. T. N. Stack is flying to India, coincided with the Twelfth Annual Exide Service Convention at that seaside resort. Mr. D. P. Dunne, Managing Director of Exide's, therefore invited Capt. Stack and his companions to a luncheon on June 14, during which it was arranged that greetings from the Convention should be carried to overseas Exide service agents in Marseilles, Brindisi, Athens, Bombay, Calcutta, Basra, Karachi and Rangoon.

Exide batteries provided the public address equipment for announcing to the spectators during the air display which celebrated the departure of the Spartan "Mailplane," which was christened "Blackpool."

L. & P. AVIATION CO.

THE advertisement of this company, whose offices are 3, Thackeray Street, London, W.8, advertising Williamson Pistol Cameras at 20 per cent. discount last week, refers, we are informed, only to a few 1931 models.

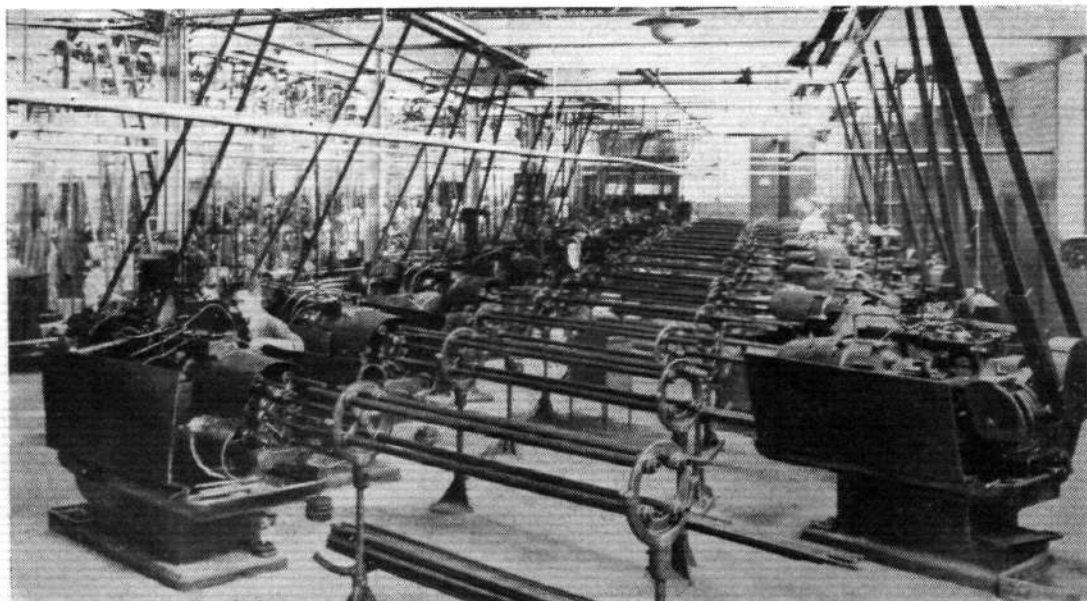
MERRIAM'S AVIATION BUREAU

CAPT. F. WARREN MERRIAM, of "Treeby," Archery Grove, Woolston, Southampton (Woolston 88572), is now extending his aviation bureau by personally keeping in touch with all firms, clubs, schools, as he finds that by visiting the various training places personally he is better able to advise parents and guardians who wish their sons to take up flying as a career. Moreover, he is thus in direct touch with people who are often in a position to employ others, and is thus better able to find his clients suitable positions. Since he opened the bureau in 1926 he has found hundreds of jobs for people, and there is no doubt that his present system of travelling round himself constantly will greatly increase the scope of his bureau and the value which he is able to give his clients.

A PISTON RING DIRECTORY

"WELLWORTHY" and "piston rings" are synonymous terms, and the latest Wellworthy 1932 piston ring catalogue and directory is clearly a successful endeavour to produce a comprehensive record of piston ring sizes. The enormous stock which is always carried by the Company at its Lymington Works, Hants, and numerous service depôts throughout the country, enables them to give instant service for any size of engine whether standard or oversize. Users of piston rings can obtain a copy of this catalogue on request to the Company, mentioning FLIGHT.

A view showing the battery of automatic lathes which turn out the bodies for Lodge sparking plugs.



THE ROYAL AIR FORCE

London Gazette, June 14, 1932.

General Duties Branch

Lt. C. A. Kingsley-Rowe, R.N., is re-attached to R.A.F. as Flying Officer, with effect from May 30, and with seny. of April 19, 1927. The follg. Pilot Officers are promoted to rank of Flying Officer:—P. F. Foss (March 12); G. R. Brice, R. A. Phillips (April 12); F. G. L. Smith (May 10); H. L. M. Glover, P. J. W. Hawkins (June 12).

F/O. J. A. Nicholson takes rank and precedence as if his appointment as Flying Officer bore date April 13. Reduction takes effect from same date. F/O. J. W. Martin is transferred to Reserve, Class C (June 3); F/O. J. C. K. Rogers is transferred to Reserve, Class A (June 13); Lt. Com. R. H. S. Roundell, R.N., Flying Officer, R.A.F., relinquishes his temp. commn. on retirement from the Royal Navy (June 1).

Stores Branch

Flt. Lt. R. Craig is placed on retired list (June 9).

ROYAL AIR FORCE RESERVE RESERVE OF AIR FORCE OFFICERS

General Duties Branch

Pilot Officer on probation B. G. Horstmann is confirmed in rank (May 4); Flying Officer H. J. Phillips is transferred from Class C to Class A (May 17); F/O. N. W. K. Seeman resigns his commn. (June 6). The follg. Flying Officers relinquish their commns. on completion of service:—J. C. Edwards (March 11); O. V. Lee (June 12); J. M. Greenwood (June 13).

F/O. R. R. Money (Lt., East Yorkshire Regt., R.A.R.O.) relinquishes his commn. on completion of service and is permitted to retain his rank (June 14).

Medical Branch

Flt. Lt. (Hon. Sqdn. Ldr.) T. M. Walker, M.R.C.S., L.R.C.P., is employed with Regular Air Force for a further year (June 2).

SPECIAL RESERVE

General Duties Branch

The follg. are granted commns. as Pilot Officers on probation:—A. D. Pickup (May 11); A. Andrew (May 15); F. Holman (May 20).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the Royal Air Force are notified:—

General Duties Branch

Flight-Lieutenants: A. E. Case, to R.A.F. Reception Depot, West Drayton, 7.6.32. A. H. Willetts, to No. 204 (F.B.) Sqdn., Mount Batten, 7.6.32. D. J. Harrison, to No. 58 (B) Sqdn., Worthy Down, 8.6.32. C. R. Mason, to No. 55 (B) Sqdn., Hinaidi, Iraq, 27.5.32. B. C. Yarde, to No. 55 (B) Sqdn., Hinaidi, Iraq, 10.6.32.

Flying Officer M. R. D. Trewby, to No. 503 (County of Lincoln) (B) Sqdn., Waddington, 8.6.32.

Stores Branch

Flight-Lieutenant L. Horwood, M.C., to No. 1 Air Defence Group, H.Q., 4.6.32.



At Buckingham Palace

H.M. THE KING held an Investiture at Buckingham Palace on June 21, when the following were among those invested by His Majesty with the Insignia of the respective Divisions of the Orders into which they have been admitted:—

Order of the Bath.

Received the Honour of Knighthood, Knight Commander:—

Military Division: Air Vice-Marshal Tom Webb-Bowen.
Civil Division: Mr. Christopher Bullock.

Companions:—Military Division: Maj. Gen. Harold Salt; Vice-Marshal John McIntyre.

Order of the British Empire.

Received the Honour of Knighthood, Knight Com-



Accountant Branch

Flying Officer R. D. Pratt to No. 210 (F.B.) Sqdn., Pembroke Dock, 23.5.32

Medical Branch

Flight Lieutenant D. A. Wilson, to Central Med. Etabt., 30.6.32.

NAVAL APPOINTMENTS

The following appointments have been made by the Admiralty:—
Lieut.-Commander S. T. Morgan, O.B.E. (Ft. Lieut., R.A.F.), to *Dundalk* (June 29).

ROYAL AIR FORCE.

Flying Officer C. F. Birks, to *Furious*, for 401 Flight (June 11).



mander:—Civil Division: Wing Com. Louis Greig.

Officers: Military Division: Col. William Rogers.

Members: Military Division: Flt. Lt. Bernard Hemsley, R. A. F.; F/O. Thomas Guttery, R.A.F.

His Majesty also conferred decorations as follows:—

Air Force Cross.

Lt. Com. Rupert Malleon, R.N.; Flt. Lt. Charles Maitland, R.A.F., and F/O. John Pugh, R.A.F.

Unveiling of the Arras Memorial

THE unveiling of the Arras memorial by Marshal of the Royal Air Force The Lord Trenchard, G.C.B., D.S.O., D.C.L., LL.D., which was postponed in view of the death of the President of the French Republic, will now take place on Sunday, July 31.



"THE FIRES OF FATE": R.A.F. Co-operation has been secured by British International Pictures, Ltd., for a film they are making in Egypt with the above title. This photograph shows a Fairey III F. flying over a detachment of the Camel Corps.

AIRCRAFT COMPANIES' STOCKS AND SHARES

MARKET conditions have undergone improvement on Lausanne hopes and leading shares have shown a satisfactory recovery on the month. Generally speaking, however, dealers are not able to report improvement in the volume of business in industrial shares, and in the circumstances it is hardly surprising there are few changes of importance on balance for the month among shares of companies connected with the aircraft and allied industries. Chief interest has attached to Fairey Aviation which are 11s. 6d. at the time writing compared with 13s. 3d. a month ago. In the past the shares have shown similar movements when talk of disarmament has been to the fore, but it is not surprising it is being argued that a good case could be made out for a higher price at the present time. Reference was made here last month to the large margin of profits for the past year over the 10 per cent., tax free, dividend paid. Handley Page participating preference have lost ground to 6s. 3d., or 1s. 3d. lower than a month ago, on uncertainty regarding the results for the past year. On the other hand, de Havilland recovered a few pence of their previous month's decline and are quoted at 13s. 9d. at the time of writing. On the basis of the 5 per cent. dividend paid for the past year the yield on these shares is on the large side at the present time. Petters ordinary and preference are each again quoted at 17s. 6d., but quotations have not been tested by business during the month. The report which falls to be issued next month will be awaited with more than usual interest on this occasion, as dealers are unwilling to estimate the dividend, there being a feeling in some quarters that the directors may conserve resources very closely. D. Napier lost 7½d. on the month to 2s. 6d., but no heavy selling has been reported, which appears to indicate confidence of holders in the ability of the management to restore

earning capacity to its previous level. The preference have been marked down during the month from 19s. 4½d. to 16s. 3d. The dividend on these preference shares falls to be paid at the end of the month. Imperial Airways have been steady and are unchanged, aided by the recent announcement that permission has been obtained to continue the Indian air mail route through Persia pending further negotiations with the Persian Government. Triplex Safety Glass have naturally come in for attention on the decision to make a return to shareholders of 10s. per £1 ordinary share. At the meeting the managing director pointed out that the factories are capable of a greatly increased output without important further capital expenditure. It is realised in the market that in view of the company's good record there would be little difficulty in raising fresh capital on satisfactory terms should this be required in the future by the further growth of the business. Rolls-Royce were quite well maintained. "Shell" have been under the influence of the annual meeting.

Examination of Applicants for Ground Engineers' Licences

AIR Ministry Notice to Ground Engineers' No. 24 of 1932 gives the information that Examining Boards will sit at London on the first and third Mondays in July and September and the second and third Wednesdays in August. At Croydon on the second Friday in July, August and September; at Manchester on the first Wednesday in July and at Bristol on the first Wednesday in September. Applications, which will be received up to 28 days before the date specified, should be made to the Secretary, Air Ministry, Adastral House, Kingsway, London, W.C.2.

NEW COMPANIES REGISTERED

DONCASTER AVIATION CO., LTD., 219, Westminster Buildings, High Street, Doncaster.—Capital £1,000, in £1 shares. Acquiring all or any part of the assets of the partnership business now carried on by A. G. D. Alderson and H. K. Addy as the "Doncaster Aviation Co.," and to establish, maintain, work, and carry on lines of aerial communication, etc. Directors: A. G. D. Alderson, 11, Thorne Road, Doncaster, aeronautical engineer; H. K. Addy, 44, High Road, Balby, Doncaster, electrical engineer; and T. J. Mammatt (chairman), The Hollins, Ilkley, Yorks, aeronautical engineer.

IRISH AIR LINES, LTD.—Capital £1,000 in £1 shares. Objects: To construct, equip, maintain, and work aeroplanes, seaplanes, etc. Directors are:—A. Pitt, 12, Cathedral Square, Waterford, pharmaceutical chemist; J. M. St. J. Kearney, 21, Fitzwilliam Square, Dublin, commercial air pilot; and E. G. Stewart, 81, Wellington Road, Dublin, commercial air pilot.

AERONAUTICAL PATENT SPECIFICATIONS

Abbreviations: Cyl. = cylinder; i.c. = internal combustion; m. = motors. (The numbers in brackets are those under which the Specification will be printed and abridged, etc.).

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Name.	Class.	Nominal Amount of Share.	Last Annual Dividend.	Current Week's Quotation.
Anglo-American Oil ..	Deb.	Stk.	5½	101½
Armstrong Siddeley Develop.	Cum. Pref.	£1	6½	12/6
Birmingham Aluminium Castg.	Ord.	£1	5	17/6
Booth (James), 1915 ..	Ord.	£1	15	41/6
Do. do. ..	Cum. Pref.	£1	7	24/-
British Aluminium ..	Ord.	£1	5	20/-
Do. do. ..	Cum. Pref.	£1	6	20/-
British Celanese ..	Ord.	10/-	Nil	5/7½
British Oxygen ..	Ord.	£1	3	9/4½
Do. do. ..	Cum. Pref.	£1	6½	20/-
British Piston Ring ..	Ord.	£1	10	25/-
British Thomson-Houston	Cum. Pref.	£1	7	24/9
Brown Brothers ..	Ord.	£1	10	25/-
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De Havilland Aircraft ..	Ord.	£1	5	13/9
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Fairey Aviation ..	Ord.	10/-	10*	11/6
Do. do. ..	1st Mt. Deb.	Stk.	8	105
Firth (T.) & John Brown	Cum. Pref.	£1	6d	6/-
Do. do. ..	Cum. Pref.	£1	5*	4/6
Ford Motor (England) ..	Ord.	£1	Nil	15/6
Fox (Samuel) ..	Mt. Ptual.	Stk.	5	72½
Goodyear Tyre & Rubber	Deb.	Stk.	6½	99
Handley Page ..	Ptg. Pref.	8/-	12½	6/3
Hoffmann Manufacturing	Ord.	£1	Nil	15/1½
Do. do. ..	Cum. Pref.	£1	7½	13/9
Imperial Airways ..	Ord.	£1	3	14/6
Kayser, Ellison ..	Ord.	£5	Nil	55/-
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Napier (D.) & Son ..	Ord.	5/-	Nil	2/6
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Roe (A.V.) (Cont. by Arm- strong-Siddeley Devel., q.v.)	Ord.	£1	—	—
Rolls-Royce ..	Ord.	£1	10	32/6
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Serck Radiators ..	Ord.	£1	15	25/-
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